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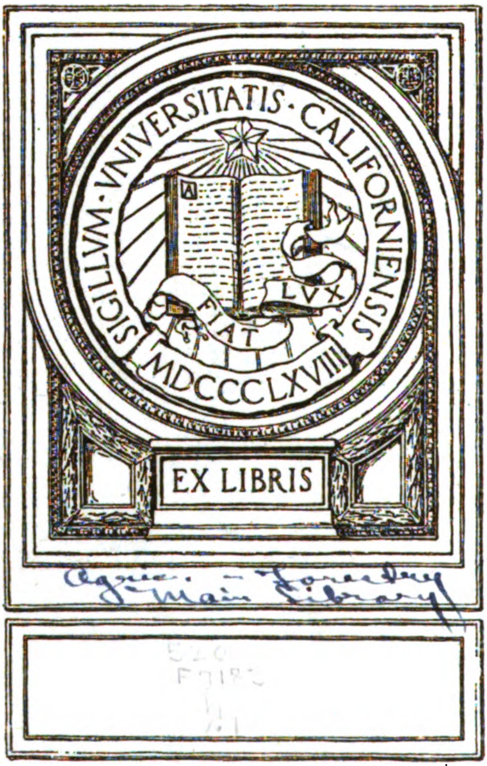

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Report of the Division of Forestry, for
the Year Ending December 31, 1905.

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the Year Ending December 31, 1906.

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the Year Ending December 31, 1908.

338486

Plate I.

Office Building.

TERRITORY OF HAWAII
BOARD OF AGRICULTURE AND FORESTRY

REPORT

OF THE

DIVISION OF FORESTRY

FOR THE YEAR ENDING
DECEMBER 31, 1905.

Reprint from the Second Annual Report of the Board
of Commissioners of Agriculture and Forestry

HONOLULU:
Hawaiian Gazette Co., Ltd.
1906

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DIVISION OF FORESTRY.

Report of the Superintendent of Forestry.

Honolulu, T. H., Dec. 31, 1905.

Board of Commissioners of
Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:—I have the honor to submit herewith the Annual Report of the Division of Forestry for the year ending December 31, 1905; and to transmit certain other reports from my assistant, the Forest Nurseryman, and from a number of the District Foresters, dealing further with the subject of Forestry in the Territory.

STAFF.

The staff of the Division of Forestry during the calendar year of 1905 has consisted of the Superintendent of Forestry, the Forest Nurseryman, and one stenographer, who has also acted as general clerk for the Board.

APPROPRIATION.

For the fiscal year ending June 30, 1905, the lump sum of $11,780.00 was appropriated by the Legislature for the incidentals and general expenses of the Board. Of this amount the Division of Forestry was allotted $4,110.00. The appropriation for Forestry salaries and pay rolls for the same period was $5,700.00; making in all for forest work of that year a total of $9,810.00.

For the present biennial fiscal period, ending June 30, 1907, the salary roll for the two officers named above, with a small additional sum for laborers' wages, is $10,000.00, or $5,000.00 per annum. The salary of the clerk and stenographer is provided for separately, under the Board.

Of the appropriations for the general expenses of the Board and its Divisions, in all $30,098.00, the allotment of the Division of Forestry for the biennial period is $8,900.00, or $4,450.00 per annum. The additional sum of $1,200.00 per annum, for the collection and propagation of seeds and plants, is also expended through this Division, thus making the total available fund of the Division of Forestry for the present fiscal period $10,650.00 per annum.

This statement may be made in tabular form as follows:

	Per Annum.	Per Period.
Salaries and Pay Rolls.............	$ 5,000	$10,000
General Expenses (allotment)......	4,450	8,900
Total	$ 9,450	$18,900
Seeds and Plants	1,200	2,400
Total Available Fund.........	$10,650	$21,300

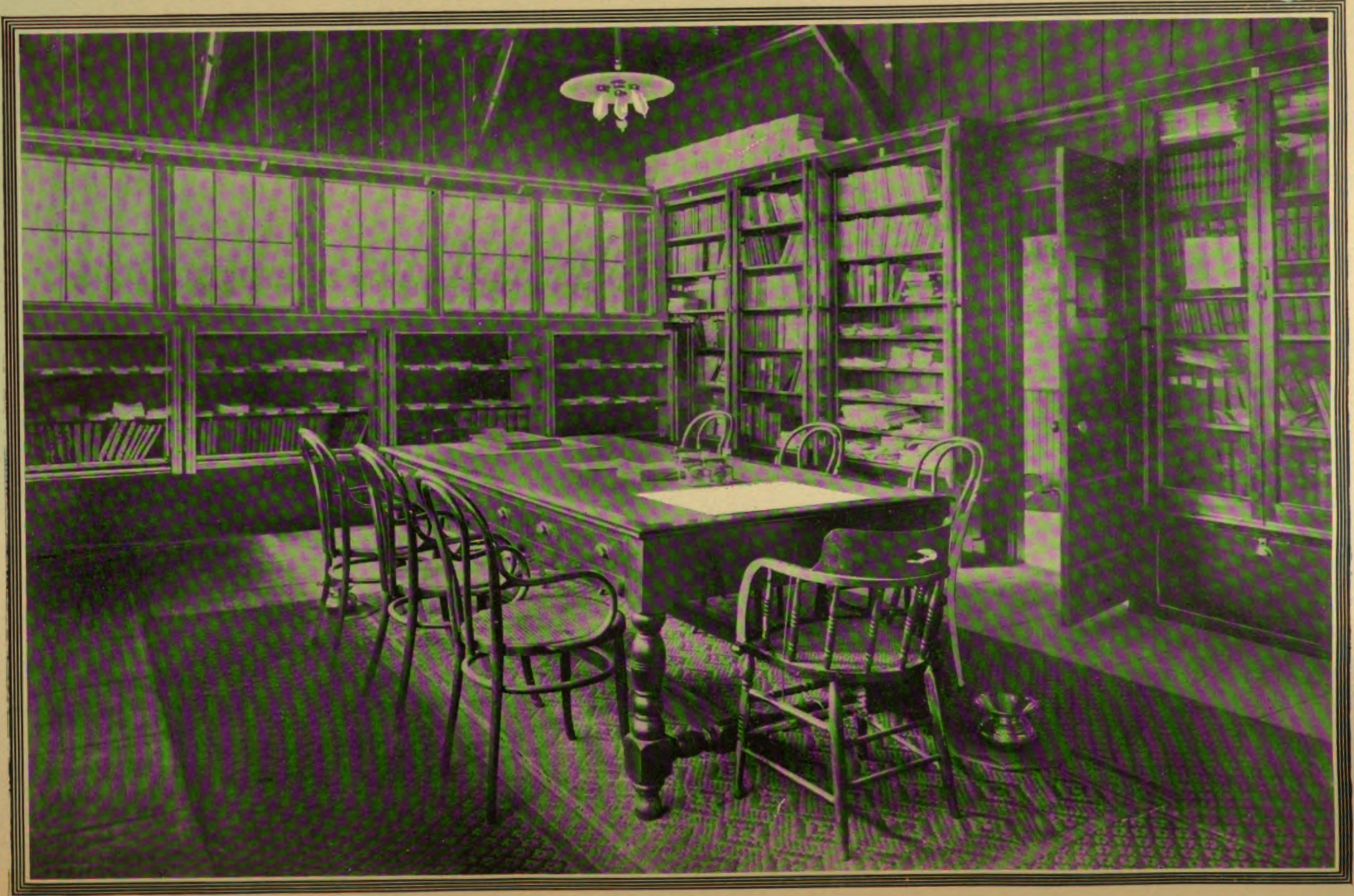
Further details in regard to the Board's appropriation may be found elsewhere in this volume.

CONTENTS OF THIS REPORT.

The work of the Division of Forestry falls naturally under one or another of several general heads. In this report it will be considered under the following divisions: Forest Reserves, Forest Extension, Miscellaneous and Routine Work, Forest Fires, General Forest Work in the Territory, and Plans and Recommendations for the Future.

FOREST RESERVES.

The main efforts of the Division of Forestry since its organization have been directed toward the creation of forest reserves, because it is believed that this is the forest work of most importance to the Territory at the present time. The necessity of maintaining a permanent forest cover on the important watersheds throughout the islands is too well understood to require discussion here. It is enough to say that success in agriculture in most parts of the Territory depends on an ample supply of water. The essential objects of the forest reserves are to protect the forests and through the introduction of a rational system of forest management to enable them to better serve the purpose of conserving moisture.



LIBRARY ROOM, BOARD OF AGRICULTURE. MEETING ROOM OF THE BOARD AND KINDRED ORGANIZATIONS.

In consequence of the limited appropriation available, other branches of the work of the Division of Forestry have of necessity had to take second place, although as will be pointed out later, as much attention as was possible under the circumstances has been given to them.

The procedure of making forest reserves in Hawaii and the relation between the total area within the reserve boundaries and the area actually set apart may be thus described.

Following an examination on the ground, the Superintendent of Forestry recommends to the Board of Commissioners of Agriculture and Forestry the reservation of the area which in his judgment should, for the best interests of all concerned, be kept permanently in forest. If the Board approves this report it adopts a resolution favoring the reserve. A public hearing is then held by the Governor and the Board for an expression of opinion. If no opposition develops, the Governor by proclamation recommends the reservation of the area suggested by the Superintendent of Forestry and actually sets apart such government lands within the boundaries of the reserve as are not under lease, or on which the leases are within two years of expiration. Thereafter the other government lands within the reserve are set apart as their leases expire. The individuals and corporations owning or controlling land within the reserve are asked to coöperate with the Board, under the law, that by the adoption of an organic system of forest management, the objects for which the reserve is created may be attained. Except as the owners coöperate with it, the Board can exercise no jurisdiction over the private lands within the reserve.

RESERVES ESTABLISHED.

At the beginning of 1905 two forest reserves had been set apart: the upper portion of the land of Kaipapau, District of Koolauloa, Island of Oahu, 913 acres; and the Hamakua-Pali Forest Reserve, District of Hamakua, Island of Hawaii, 18,940 acres.

During the year three more forest reserves have been created, embracing a total of 190,469 acres, of which 38,844 acres of government land have been actually set apart.

The following table shows the name, location, area and date of creation of the existing forest reserves:

FOREST RESERVES.

No.	Name	District	Island	Area Government Land Actually Reserved	Total Area Recommended to be reserved	Date of Proclamation	Proclamations Signed by
				Acres	Acres		
1	Kaipapau ...	Koolauloa ..	Oahu ..	913	913	Nov. 10, 1904	Geo. R. Carter
2	Hamakua Pali	Hamakua ...	Hawaii ..	17,000	18,940	Dec. 23, 1904	Geo. R. Carter
3	Hilo	Hilo	Hawaii ..	12,771	110,000	July 24, 1905	A. L. C. Atkinson
4	Koolau, Maui	Koolau, Hamakua-loa	Maui ...	15,083	42,969	Aug. 24, 1905	A. L. C. Atkinson
5	Halelea	Halelea	Kauai ..	10,990	37,500	Aug. 24, 1905	A. L. C. Atkinson
				56,757	210,322		

DURING THE SPRING OF 1906, WHILE THIS REPORT WAS IN PREPARATION, TWO ADDITIONAL FOREST RESERVES WERE SET APART, AS FOLLOWS:

6	Kealia	Puna	Kauai ..	7,385	9,935	Mar. 9, 1906	A. L. C. Atkinson
7	Ewa	Ewa, Waianae and Waialua	Oahu ...	4,759	28,550	Mar. 9, 1906	A. L. C. Atkinson
				68,901	248,807		

Hilo Forest Reserve.

The Hilo Forest Reserve embraces the area of heavy forest on the lower slopes of Mauna Kea, lying between the 1855 and 1881 Lava Flows back of Hilo Town and the Hamakua District line, and extending from a line varying in elevation from 1,750 to over 2,000 feet, drawn back of and above the sugar plantations to another line along the upper edge of the woods, at an elevation of approximately 6,000 feet. The water from this reserve is of great importance to all the plantations along the coast, being at present used for the most part for fluming cane to the mill. From the character of the country many of the streams could be utilized for the production of power. This will be an important consideration when the Hilo District comes to be developed, as it is sometime bound to be. The object of the Hilo Forest Reserve is to protect the sources of this important water supply.

Koolau (Maui) Forest Reserve.

The Koolau Forest Reserve on Maui, takes in the greater part of the watershed on the windward side of that island, the area from which comes the water for irrigating the central plain lying between the two Maui mountains. Hardly anywhere outside of Southern California is there a more striking object lesson of the benefits of irrigation than that afforded by this section, much of which has been transformed, through the application of water, into some of the most productive cane fields in the Territory. The area included in the Koolau Reserve extends from the land of Opana to the boundary of the Hana District, and from the line of the new Koolau Ditch and its extension to the northern crest of the crater of Mt. Haleakala.

Halelea Forest Reserve.

The Halelea Forest Reserve on Kauai, includes an area of mountainous land, much of which is naturally protected because of its situation and topography. The main economic value of the section comes from the fact that the streams rising in the Reserve may be used to develop power and possibly, in part, for irrigation. The Reserve includes all the higher portion of the Halelea District, above a line drawn parallel to the coast, at the upper limit of the agricultural and good grazing land.

Detailed Reports on the Reserves.

It is the usage of the Board to publish in full in its official organ, the Hawaiian Forester and Agriculturist, the reports of the Superintendent of Forestry and of the Committee on Forestry, with the resolutions adopted by the Board, in regard to each forest reserve recommended. The reports on the Hilo Reserve may be found in the issues of October and November, 1904; those on the Koolau and Halelea Reserves in that of August, 1905.

Co-operation with Private Owners.

The law creating the Board provides for the management by the Board of privately owned forest land, but owing to the fact that no money was appropriated for the employment of forest rangers, the lack of an established system of reserve administration has in large measure deterred private owners from cooperating with the Board in this matter. This is only natural, for without men the Board cannot hope to give as efficient protection as the forests in many cases now receive.

Furthermore, under the law as it now stands, only government land that is unleased, or on which the lease has less than two years to run, can be set apart by the Governor as a forest reserve. The law would be better if it permitted the Governor to set apart all government land within the reserve boundaries, subject, of course, to existing leases. The reason for this statement is that if the owners or lessees of adjoining forest land knew just what the intentions of the government were regarding the government lands within the reserve, they would be much more ready than they now are to coöperate with the Board in putting into force an organic system of forest reserve administration.

The present situation is most unsatisfactory and calls for united and determined remedial action, for without unity of purpose in the management of the lands of a given forest reserve it is impossible to secure the most efficient protection. And unless there is a regular paid staff to carry them out, plans for the development and betterment of the forest are of little avail.

As a temporary expedient, arrangements have been made in several cases whereby employees of a plantation or other company interested in the welfare of a certain reserve act as forest rangers. But such an arrangement, although it yields good results for the time being, is neither permanent nor truly satisfactory.

One of the most encouraging signs in the whole matter is the action about to be taken by the firm of Alexander & Baldwin, whereby the management of the lands owned or controlled by them within the Koolau Forest Reserve on Maui, is to be turned over to the Board. It was hoped that this report might record the consummation of this transfer and give the details of the coöperative arrangement, but although practically completed the final papers had not been signed on December 31st.

The arrangement with Alexander & Baldwin is based on the assumption that the Board will shortly be in a position to put into effect an efficient system of forest reserve administration. Until then the present plan of control through rangers jointly employed will be continued.

Mr. A. S. Wilcox has signified his intention of following the lead of Alexander & Baldwin in this matter, in regard to certain lands belonging to him in the Halelea Reserve on Kauai, and it is expected that others will do likewise.

The fact that such action has been or is to be taken by prominent firms and individuals will, it is believed, act as a strong lever when pressure is brought to bear to secure an appropriation for forest rangers from the next Legislature. It is with the firm conviction that money for the employment of forest rangers will be forthcoming when the needs of the situation are really understood, that the work of creating new reserves is being steadily pushed. But to secure the ends desired the active and earnest support is needed of all those whose interests are involved or who wish to see the best use made of the Hawaiian forests.

Change in the Law.

Mention may be made here of an amendment to the forest reserve law (Chapter 28, Revised Laws) by Act 65 of the Session Laws of 1905, which provides that the Governor may, from time to time, with the approval of the Commissioner of Public Lands, after a hearing or hearings, as by law provided, revoke, modify or suspend any and all the orders and proclamations or any part thereof, which set apart lands as forest reservations. This law was passed at the instance of the Commissioner of Public Lands, with the object of providing a less cumbrous procedure than formerly existed, by which forest reserve boundaries could be modified. The new law is an improvement on the original, but it would be better had the consent of the Board of Agriculture and Forestry as well as of the Commissioner of Public Lands been required before changes in a reserve could be made.

RESERVES UNDER WAY.

The nature of the work of establishing forest reserves is such that the table of existing reserves at any one time is a poor index of the work actually accomplished up to that date. Much preliminary detail has to be gone through with, both in the field and in the office, before a report recommending the creation of a given reserve can be made by the Superintendent of Forestry. Then the regular routine action by the Committee on Forestry and by the Board, followed after an interval of at least a fortnight by the Public Hearing, takes perhaps another month, so that between the initial field work and the day when the proclamation is signed by the Governor, a considerable period of time must necessarily intervene. It frequently happens, too, that various outside details have to be arranged which still further delays the regular order. A case in point is the proposed Kealia Forest Reserve on Kauai, where the initial field work was done in May, 1904; the report on this reserve went to the Committee on Forestry on December 30th,

1905. The report on another important project, the proposed Ewa Forest Reserve on Oahu, will be completed during the first fortnight of January, 1906, and will probably be put through with or shortly after the Kealia Reserve.

The Proposed Kealia Forest Reserve.

The proposed Kealia Forest Reserve includes the higher portion of the north end of the Puna District on Kauai, embracing the three government lands of Anahola, Kamalomaloo and Kapaa, and the privately owned land of Kealia. Altogether it covers an area of 9,935 acres, of which 7,385 acres is government land which can be set apart at once.

The Proposed Ewa Forest Reserve.

This reserve takes in a good share of the western slope of the Koolau Mountain draining into the Ewa Basin, on the Island of Oahu. It covers in all 28,550 acres more or less, of which the greater part is privately owned land. The area belonging to the Territory within the reserve is 5,142 acres; of this 4,759 acres can be set apart at once.

Other Proposed Reserves.

Kau Forest Reserve.

The proposed Kau Forest Reserve takes in a large section of the native forest on the lower slope of Mauna Loa, back of the Pahala and Hutchinson Plantations. Much of the area has been protected from cattle for a number of years by these plantation companies, and maintained by them as a private forest reserve. This project will be reported upon as soon as a description of the boundary is received from the Government Surveyor, who is now at work on the ground.

Honuaula Forest Reserve.

A small but important reserve is about to be made on a portion of the land of Honuaula, North Kona, Hawaii. This land contains one of the best stands of Koa (*Acacia koa.*) on any government land in the Territory, which in view of the growing market for Koa lumber is of no small potential value. The land was leased by the last administration for grazing purposes, but by an arrangement with the lessees, effected through the courtesy of the Commissioner of Public Lands, the forested portion has been relinquished to the Board. A relocation of the boundary is to be made by one of the Government Surveyors during January, 1906, following which the land will be set apart, as the Honuaula Forest Reserve. The area is between 600 and 700 acres.

Kohala and Hamakua.

Preliminary field investigations have already been made on the Kohala Mountain and in a part of the Hamakua District on Hawaii, which will facilitate final action when certain other factors in the case are favorable. In North Kohala a careful examination has been made on the ground so that no further field work is necessary for the present in that section.

The necessity of forest preservation in North Kohala is perhaps more pronounced than anywhere else in the Territory, but owing to complications of private ownership and leasehold the problem is a very difficult one to solve.

Other Examinations Already Made.

Preliminary examinations have been made on the West Maui Mountain and in the Hana District on Maui, in both of which localities forest reserves are projected. The West Maui Districts are next on the regular program of reserve work.

On Oahu an extension of the Ewa Reserve in the Waialua Basin, and an area on the Waianae Hills only await technical descriptions of the proposed boundaries before being reported upon, and these have been promised in both cases by private corporations interested in the creation of these reserves. Another section of the proposed forest reserve on the Waianae Range, including parts of the lands of Makua and Keaau, is still further advanced, a report upon it having already been approved by the Board, while a report on the land of Lualualei is now in preparation.

On Kauai preliminary field work has been done on two areas which it is expected will later be created forest reserves; these are the upper part of the Koolau District and the section including the private reserve maintained by the Lihue Plantation Company, adjoining the proposed Kealia Reserve.

Forest Lines.

Mention may here be made of several requests that have been received from the Commissioner of Public Lands in relation to fixing the forest line on lands to be again leased or to be opened as homesteads. This work has often been made a part of studies leading to the creation of projected forest reserves, but it has also included some special examinations in sections which were not to be taken up until later. Reports on the location of the forest line have been submitted for the lands of Kaohe 4, Opihihale, and the Olaa Remnant on Hawaii, for the land of Nakula on Maui, and for the Palolo Homestead Tract and the lands of Makua and Keaau on Oahu.

RESERVES PROJECTED.

Among the forest reserve projects which have yet to be undertaken, beside those already mentioned as being now under way, are the following:

On Kauai, a portion of the great upland area on the land of Waimea should be made a forest reserve. It is expected that an examination of this area will be made during the coming summer.

On Oahu, portions of the Waianae Range, not covered by reserves already mentioned, need attention, as does also the area between the existing Kaipapau and the proposed Waialua Reserve. Sections on the windward side of Oahu also wait to be visited and reported upon.

On Molokai nothing has as yet been done by the Government toward officially recognizing the existing private forest reserves or extending their boundaries, while in the Districts of Kula, Honuaula and Kahikinui, on Maui, there are problems of forest replacement waiting to be solved.

Hawaii, beyond the areas already discussed, is perhaps in less need of immediate attention, but there are still many localities on that island that should be investigated and reported on, as for example, the mountain land of Kaohe and certain government tracts in South Kona.

The pressing need on Hawaii is that something be done and done at once to better protect the forest in Kohala and Hamakua. Unless such action is taken within the very near future the forest will disappear from large areas of land which should be kept permanently under a forest cover. If this happens the forest can only be replaced after great labor and expense.

Additions to Existing Reserves.

From time to time as the leases on forest lands within the boundaries of one or another of the existing forest reserves come within two years of the date of expiration, the attention of the Governor will be drawn to the matter, with the request from the Board that he set apart the given land as an addition to the Reserve. In the near future several areas will, in this way, be added to the Hilo Forest Reserve, while later other reserves will receive similar accessions.

Reserve Boundary Monuments.

Realizing the importance of having the principal points along the forest reserve boundaries plainly marked with permanent monuments, particularly certain corners and other points that have been located with care and expense, forest reserve monuments have been made consisting of two 4½ foot sections of galvanized iron pipe, the upper section carrying a target, also of galvanized iron, stamped with the letters F. R. T. H. (Forest Reserve, Territory of Hawaii).

There are two types of the monument. In one the two sections screw together by means of a threaded collar; in the other, the upper pipe fits over the lower, so that it can be easily removed if it is desired to set up an instrument on the station, the upper pipe being held in place by a bolt, secured by a railway switch padlock. The former is used at points in the woods not likely to be needed in relocation; the latter at stations which may often be needed for reference in other survey work. No monuments were erected during 1905, but orders have been given for marking several lines early in 1906.

Co-operation of the Government Surveyor.

In this connection I wish to express my appreciation of the coöperation of Mr. W. E. Wall, Government Surveyor, in many matters regarding the boundary lines of proposed forest reserves. His uniform courtesy in furnishing the desired descriptions and other information has added materially to the success of the work of this Division.

FOREST EXTENSION.

The second main branch of the work of the Division of Forestry is the extension of a forest cover over waste and barren areas or other land which can more profitably be used to produce trees than some other crop. Under this section comes, of course, the establishment of forest plantations made with the object and idea of commercial returns. Next to the creation of forest reserves this is believed to be the most important forest work at present to be done in the Territory.

Forest Extension in Hawaii is carried on through two channels: (1) by advice and practical assistance given in the form of planting and working plans, correspondence or verbal direction to individuals or corporations desiring to engage in any class of forest work, and (2) by the collection, sale and distribution of seed and seedling plants of native and introduced trees and shrubs of value for use in the islands.

ADVICE AND ASSISTANCE.

Following the usage of the United States Forest Service, the Division of Forestry has stood ready, at all times since its organization, so far as its resources permitted, to answer by practical advice, all questions in regard to tree planting, forest management or other germane forest subjects referred to it. The offer has been made and repeated both verbally and in print and during the last year has led to a considerable number of requests, the inquiries for the most part having to do with tree planting. But although more likely to be called upon for advice in starting forest plantations the Division is prepared to suggest methods of management for plantations already established, or to make working plans for the systematic cutting of stands of trees which have reached merchantable size or greatest economic value.

Unfortunately, few of the native Hawaiian trees are of commercial importance, so that working plans for the utilization of the native forest are not often called for. But where a market does exist, as for Koa, the Division of Forestry is ready to assist the owner to do his logging in accordance with the methods of practical forestry.

In this connection it may be noted that after a study of the situation made on the ground in December, 1904, the Superintendent of Forestry prepared a statement with recommendations for the Trustees of the Bishop Estate, in regard to the lumbering of the Koa on the land of Keauhou, Kau, Hawaii. While not all of the recommendations made in the report were adopted, the general plan outlined therein was embodied in a contract made with a company formed to undertake the lumbering. Up to the end of 1905 actual work in the woods had not begun, but many preliminary details have been settled so that the early months of the coming year should see the work fairly under way.

During 1906 it is expected that the preparation of planting plans will take a larger place than has been possible heretofore, owing in part to the publication in December, 1905, of Circular No. 1 of the Division of Forestry, entitled "An Offer of Practical Assistance to Tree Planters." This Circular explains what the Division of Forestry is prepared to do for individuals or corporations desiring to plant trees, and is being widely distributed throughout the Territory. The offer does not differ from that which has been held open for the past two years, but owing to the limited resources of the Division it has not until recently been deemed advisable to give it the publicity now possible. Already several requests for planting plans have been received and during 1906 it is expected that much of the time of the Forest Nurseryman will be occupied in this branch of forest work. For details in regard to the requests for advice and assistance which have been received during 1905, the report of the Forest Nurseryman should be consulted.

Another publication of the Division of Forestry which should be mentioned in this connection is Press Bulletin No. 2, entitled "Suggestions in Regard to the Arbor Day Tree Planting Contest," issued in October, 1905. This press bulletin contains careful directions of how the trees to be planted on Arbor Day on school grounds and elsewhere should be set out to insure the best results. A description of the observance of Arbor Day appears later in this report.

COLLECTION, SALE AND DISTRIBUTION OF SEED.

The collection and dissemination of seed of trees and shrubs carried on by the Division of Forestry, is effected through the Government Nursery at Honolulu. Since May, 1904, the Nursery has been conducted on a forest basis and except for ornamental plants grown for use on school and other public grounds, the stock carried has been limited strictly to trees and shrubs of economic importance, other than fruit-bearing species.

The plan now followed is to keep constantly on hand fresh seed of the native and introduced trees, which have been found to be of value in the Territory, the seed being sold at prices just covering the cost of collection or import. A limited number of seedlings is also kept on hand and sold at prices just covering the cost of growing. These young trees are intended for persons who desire a comparatively few trees each, too small a number to make it worth their while to grow the trees themselves. In all extensive planting the recommendation is always made that a local nursery be established to supply the stock needed. The report of the Forest Nurseryman contains a detailed statement as to the kinds and amount of seed collected and sold during 1905.

To facilitate the handling of this branch of the work a press bulletin (No. 1 of the Division of Forestry) was issued in April, 1905, giving a list of the seed on sale, with the price and approximate number of seed per ounce. The latter data were included because of the general lack of knowledge regarding the size of the seed of certain trees, especially among the Eucalypts. A revised edition of the seed list, with additions, will be issued early in 1906.

Beside keeping seed and plants on hand, the Division of Forestry stands ready at all times to advise persons so desiring in regard to the purchase of exotic trees, plants or seeds which it is not advisable or possible to carry in stock.

To this end a collection of catalogues of leading nurserymen and seed houses throughout the world is maintained. The file is already sufficiently comprehensive to meet most demands, but is being continually added to by later editions and the publications of additional firms.

Since the discontinuance of the general free distribution at the Government Nursery, several local firms have begun to deal in special lines of fruit and ornamental stock. The Division keeps informed as to the specialties handled by the local nurseries, so that persons making inquiries about such stock can be referred to them.

The Division is also prepared to recommend one or two men who have been trained in the proper methods, to persons desiring to prune their trees in accordance with rules based on the principles of tree growth.

Free Distribution.

Although general free distribution has been discontinued, plants and seed are furnished free to schools and other public grounds, other than the Honolulu Parks.

Forest trees in small lots are also given without charge, provided the freight is paid, to homesteaders who desire, or whose leases require them, to plant trees. Much of the success of the Arbor Day celebration was due to the trees sent out from the Government Nursery. Of late some trees have also been furnished free for the street planting resulting from the city improvement spirit which is now making such happy progress in Honolulu.

PLATE V.

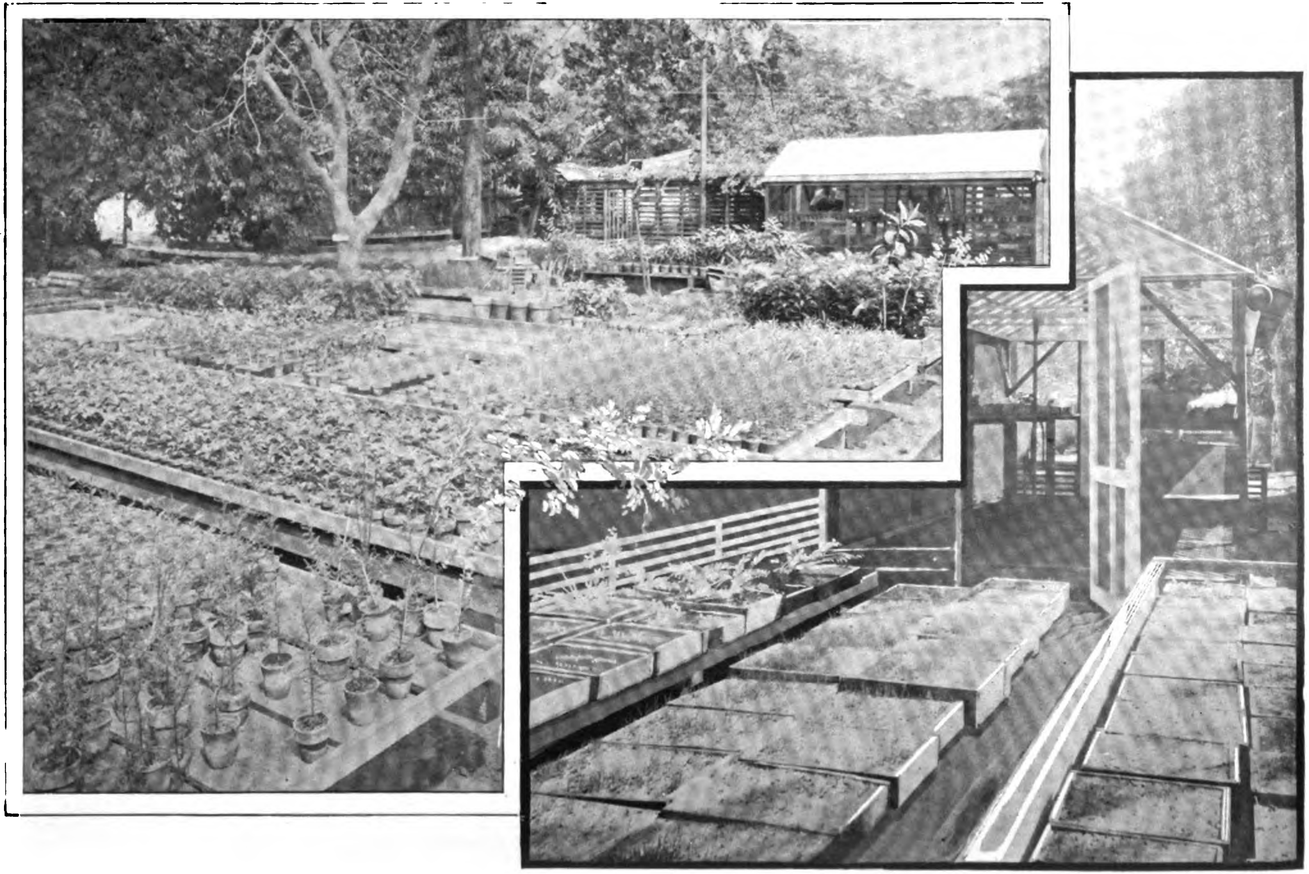


FIG. 1.—FOREST AND ORNAMENTAL TREE SEEDLINGS FOR SALE AND DISTRIBUTION. FIG. 2.—SEED TESTING HOUSE USED FOR EXPERIMENTS AND GERMINATION TESTS.

Congressional Vegetable Seed.

Although properly apart from the regular work of the Division of Forestry, mention may perhaps be made here of the distribution of the free vegetable seed, furnished by the Delegate to Congress, Hon. J. K. Kalanianaole. At the suggestion of the Superintendent of Forestry, the Delegate turned his quota of seed over to this Division for distribution in both 1904 and 1905. In 1904 the seed was sent out in response to requests received in answer to notices in the newspapers.

The 1905 seed, received in November, has, by arrangement with the Superintendent of Public Instruction, been distributed through the schools, each Principal who responded to a circular letter prepared by the Board of Education being sent sufficient seed to give a package of each kind to every family represented in the school.

It is probable that the Hawaii quota of seed for 1905 has been distributed in as equable and general a manner as any seed ever sent out by a Congressman. It is a case where a bad system has been turned to good use.

Rubber.

The interest in rubber has led to many inquiries as to the best kinds to plant, the supply of seed, etc. Through an arrangement with Mr. Jared G. Smith, a number of persons have been referred to him by this Division and furnished with seed imported by him at a price, including the customs duty, much lower than that at which an ordinary individual in the islands could hope to obtain it.

In accordance with the provisions of the law making appropriations for the present fiscal period, plans have been made "to experiment with rubber trees on government lands," which will be put into effect during the coming year.

Through the courtesy of Mr. S. M. Damon, the Division of Forestry has secured the right to establish an experimental plot for the study and propagation of rubber trees in the Huluamanu Valley, at Moanalua, about a mile and a half above the polo field. The trees set out there are some two dozen of the Central American species *(Castilloa elastica)* secured from Mexico some little time ago by Prof. A. Koebele. This species is hard to procure owing to the seed retaining its vitality but a short time. The trees at Moanalua will be grown, propagated by cuttings and later distributed under suitable provisions. The trees were planted at Moanalua because the conditions there are better adapted for rapid and vigorous growth than in any other locality easily accessible from Honolulu.

OTHER WORK AT THE NURSERY.

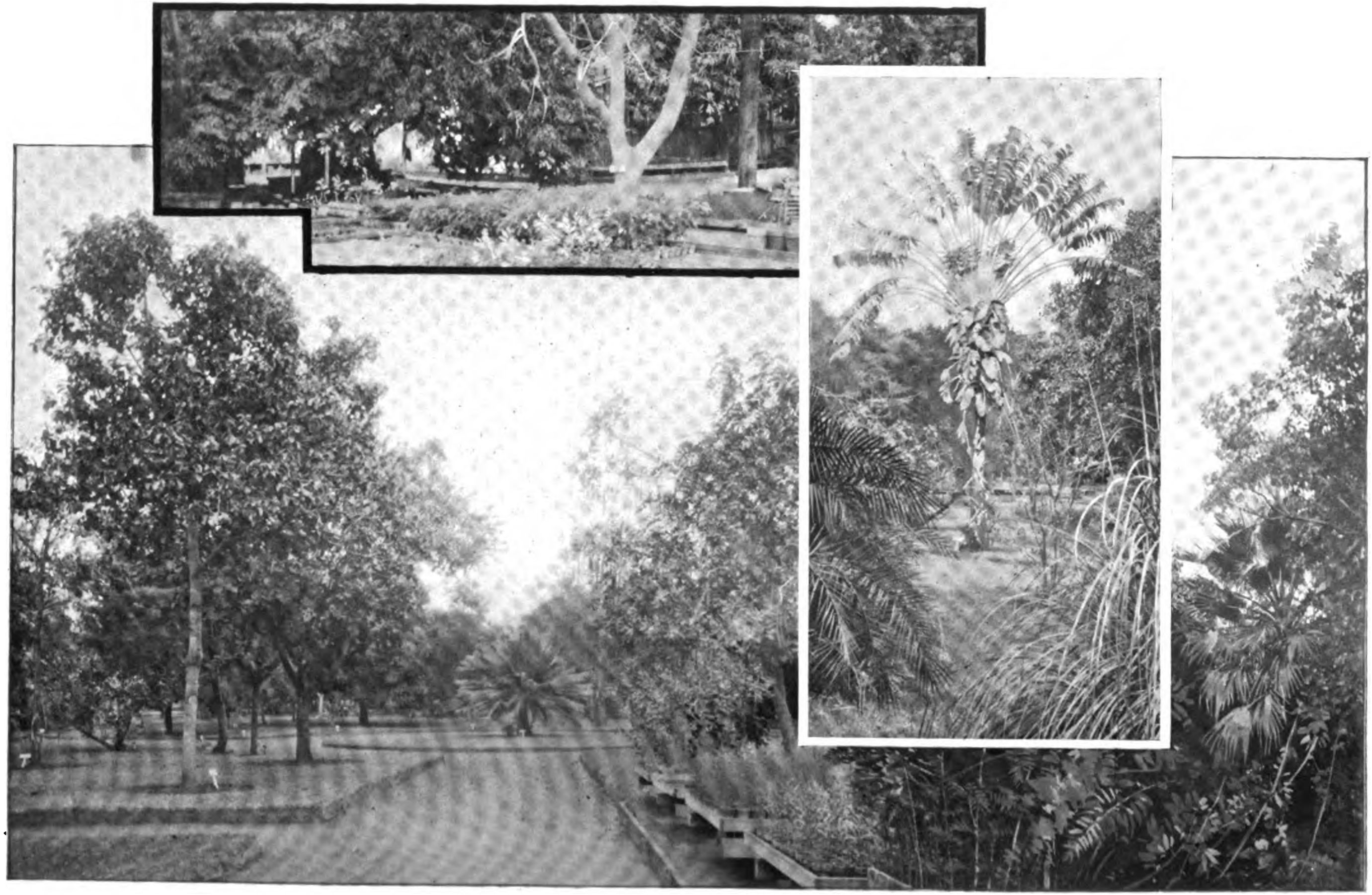
Besides the growing of seedlings, the Government Nursery serves other ends of value to the people of the Territory. Chief among these is the experimental work carried on to determine the value to the Territory of trees and shrubs heretofore untried, or only imperfectly known here.

By exchange and purchase exotic seed is from time to time received and having been tested at the Nursery, is sent to correspondents on the different islands, or started in the Nursery, when the young plants are later sent out. The names of the more important exchanges of the Division and of the gentlemen in the Territory who have volunteered to assist in this work may be found in the report of the Forest Nurseryman. The introduction of valuable new trees and plants is a very important field of work, capable of almost infinite expansion. In later years it is hoped that it may be made one of the chief lines of activity in the Division.

Seed Testing.

Allied both with the experimental and the seed introduction work is the testing of seed collected locally or received from abroad. Germination tests are made of all seed before it is sent out from the Nursery, which insures its freshness and purity, a matter of no small importance to local planters.

To facilitate the seed testing a specially constructed, glass-roofed, ant-proof house, with adjustable canvas curtains, was erected early in the year, in which the seed testing and experimental work can be carried on under conditions heretofore impossible. The protection afforded by this house has greatly



GROUNDS OF THE GOVERNMENT NURSERY.

VIEWS IN THE NURSERY GROUNDS.

reduced the percentage of seedlings killed by the "damping off fungus," which had before been a source of serious loss, particularly with small lots of rare imported seeds.

Nursery Grounds.

Early in the year small wooden markers were placed beside the trees in the Nursery grounds, each one bearing the common and scientific name of the tree. As the Nursery in a way takes the place of a botanic garden—a feature by the way, which Honolulu should not be longer without—these labels have been much appreciated by visitors desiring to learn the local tree names.

During the past year the Nursery grounds have been brought into presentable condition. More remains to be done, but the Nursery as it now stands is a great improvement over what it was two years ago.

Closely connected with the work at the Nursery is the care of the forest plantations in upper Nuuanu Valley and on Tantalus.

NUUANU VALLEY.

During the year the forest plantations in Nuuanu Valley have been kept in shape by two laborers regularly employed who are stationed at the Forester's cottage, a mile or so below the Pali.

No new planting has been undertaken, but the grass and weeds around the young trees have been kept down and general care taken of the forest plantations established in past years.

A noticeable change has taken place within the last year in the appearance of the planted forest in Nuuanu. Many of the saplings are now getting up where they can be seen above the long grass, and in general the trees appear much more thrifty than they did a year ago. During 1906 the work in Nuuanu Valley will be continued along the same lines.

TANTALUS.

Although Tantalus forest is not directly under the control of the Board of Agriculture and Forestry it has, by direction of the Superintendent of Public Works, been turned over to this Division for management. There is much which ought to be done on the government portion, in the way of thinnings, etc., but owing to the fact that little of the government timber to be so obtained is readily salable, and to the lack of sufficient appropriation, little can at present be attempted. Some dead wood has been removed by a Portuguese woodcutter working under the direction of the Forest Nurseryman, while several of the old trails have been cut out and made passable.

This latter work is important as an aid in fighting forest fire should that misfortune ever happen to the Tantalus forest.

With the clearing of the trails a number of groups of valuable exotic trees have been made accessible and the obstructing vegetation cut away to give them a fair chance.

Early in the year steps were taken looking to the acquisition by the Territory of the portion of the Tantalus forest belonging to the Coney Estate, but as yet nothing tangible has come of it. The matter should be taken up and put through, for under the present status there is nothing to prevent the clean cutting of a large part of the Tantalus forest at any time. A bill to create the upper part of Tantalus a public park was introduced at the last session of the Legislature but failed to pass.

MISCELLANEOUS AND ROUTINE WORK.

Beside its regular and more important work the Division of Forestry endeavors, so far as its appropriation allows, to carry on other lines of forest work of value to the Territory. Chief among these are the collections. These consist of the herbarium, the exhibit of Hawaiian woods, a series of photographs illustrating Hawaiian forests and forest conditions, systematic notes on the trees and forests of the islands, and the collection of maps of forest and other lands, not to mention the accessions of forestry books to the Board Library. Lack of means and a staff of only two men has hindered the growth of the collections, but a start has been made on each.

During the coming year the maps will be classified and properly housed in a new map case and the collection indexed by a card catalog. A card catalog of the forest lands in the Territory is also projected, giving the name, location, ownership, date and terms of existing lease, if government land, and other similar information. Such a catalog would be of great assistance to the staff, especially in keeping track of lands to be added to existing reserves.

In the gathering of botanical notes that has gone on during the year, special attention has been paid to the preparation of a table showing with exactness the times of flowering and of fruiting of the important forest, ornamental, and fruit trees in and about Honolulu.

Mention may perhaps be made here of the shipment to the U. S. Forest Service of sections of the logs from which were prepared the specimens of Hawaiian woods in the exhibit room of the Board, a slight recognition of the many favors received from that Bureau.

ROUTINE WORK.

During the year reports covering the work of the Division have been prepared by the Superintendent of Forestry and submitted at each regular meeting of the Board, while the Forest Nurseryman has filed weekly reports describing the work under his immediate charge.

Special reports on the progress of forestry in the Territory have by request been prepared by the Superintendent of Forestry for the annual report of the Governor of the Territory to the Secretary of the Interior, for delivery at the annual meeting of the Hawaiian Sugar Planters' Association and before the Farmers' Institute. He has also contributed articles on forest subjects to the Hawaiian Forester and Agriculturist, to Thrum's Annual and to the daily press.

PUBLICATIONS.

The publications of the Division of Forestry issued during the year are as follows:

Press Bulletin No. 1. A list entitled "Forest and Ornamental Tree Seed for Sale at Government Nursery." 3 pp. Issued April, 1905. (1000 copies.)

Press Bulletin No. 2. "Suggestions in Regard to the Arbor Day Tree Planting Contest." 7 pp. Issued October, 1905. (750 copies.)

Circular No. 1. "An Offer of Practical Assistance to Tree Planters." 6 pp. Issued December, 1905. (2,000 copies.)

Two circulars are now in preparation on "The Proper Methods of Pruning Street Trees" and on "Suggestions for Fighting Forest Fires," and as a press bulletin, a revised list of the seed on sale at the Government Nursery. Other circulars are projected, especially one on the "Culture and Uses of the Cocoanut," and it is hoped that during the year one or more bulletins may be prepared on the results of forest plantations made in these islands within the past thirty years.

The routine office work has been further systematized during the year by the addition of needed units in the filing cabinets, the extension of the card system and other like mechanical aids.

DISTRICT FORESTERS.

During the year several changes have taken place in the personnel of the staff of District Foresters through death, removal from the Territory and by appointment. In the death of Mr. Franz Buchholtz, who passed away February 16, 1905, the Territory sustained a real loss, for men of his type are much needed in a community like ours.

Owing to removal from the Territory, resignations have been received from Messrs. George Ross of Hakalau, Hawaii, E. E. Olding of Kohala, Hawaii, and Andrew Moore of Kilauea, Kauai.

The new appointments are Mr. John M. Ross, to succeed Mr. George Ross; Mr. F. Scott, to succeed Mr. Moore; and Mr. Eric H. Edwards, to take Mr. Buchholtz's place. On December 31, 1905, no one had been appointed to succeed Mr. Olding.

Additional District Foresters have been appointed as follows:

Mr. W. F. Pogue, for the District of Koolau and the east half of the District of Hamakualoa, Island of Maui.

Mr. John A. Scott, for that portion of the District of Hilo, Island of Hawaii, extending from the Puna District Line to and including the land of Kikala.

Mr. George W. McDougall, co-forester with Mr. W. R. Castle of Honolulu, for that portion of the District of Kona, Island of Hawaii, extending from the land of Kaapuna to and including the land of Hookena.

Mr. Charles Gay, in and for the island of Lanai.

A change in the forest district boundaries has been made on Maui, whereby Mr. Pogue now covers part of the area formerly in the district of Mr. H. A. Baldwin.

A list of the District Foresters, with their respective districts, may be found elsewhere in this report.

FOREST FIRES.

The early months of 1905 witnessed a prolonged drought in the islands which led to a number of serious forest fires, especially on the leeward side of the islands of Hawaii and Oahu.

SOUTH KONA FIRES.

The fires in South Kona, Hawaii, and the one at Wahiawa, Oahu, were the most serious. The former started on February 22, 1905, and was first reported to Land Commissioner Pratt a day later. As the result of a rapid interchange of wireless messages the Governor and the Board authorized the Superintendent of Forestry to go over to Kona, which he did on February 25 on the U. S. Revenue Cutter *Bear*, through the courtesy of Captain Hamlet, who chanced to be just starting on a cruise to Hawaii.

On arriving in Kona a fire fighting gang was at once organized under the direction of Mr. G. W. McDougall, and the work of getting the fire under control begun. The land where the fire occurred is covered with rough a-a lava, out of which grew a fairly dense Ohia Lehua *(Metrosideros polymorpha)* forest. Over much of the area the undergrowth was Uluhi or Staghorn fern *(Freycenetia arnoti)*, which when dry is extremely inflamable. The fire was for the most part a surface fire, confined to the Uluhi, although it constantly tended to become a ground fire in type, by hanging in the dry vegetable matter in the openings in the lava.

Having had a start of a week the fire had already burned over a considerable area, before the fighting began; consequently the work was at first confined to widening two old trails on either side of the fire into fire lines to prevent the fire from spreading and to give bases from which to work. After several days, welcome rains so far subdued the fire that it was got under control and apparently extinguished. Leaving guards to patrol the area the Superintendent of Forestry returned to Honolulu, only to hear some six days later that the fire had again broken out, apparently from some point where it had been smouldering in the crevaces in the rocks.

Mr. McDougall was authorized to continue the fight which he did by surrounding the new fire by fire lines and gradually stamping it out. After about a fortnight he reported that heavy rains had completely extinguished the fire.

The forest on the area burned over consisted mainly of Ohia Lehua trees 6 to 10 inches in diameter breasthigh and from 30 to 50 feet tall. Being a thin barked tree most of the Ohias were killed by the fire, although few were actually consumed. The loss is hard to reckon because while at present only marketable as firewood, the type of Ohia growing in South Kona has a potential value which in the future may make it of considerable worth. The total area burned over is estimated at 2500 acres.

The origin of the South Kona fire is unknown. Certain signs point to its having been set to secure more open pasturage; others to its escape from a wood cutters' camp. No reliable evidence could be secured in either case.

Special Appropriation.

At the instance of Governor Carter, a bill providing for an emergency appropriation of $2,000.00 was introduced in the Legislature and speedily passed. The cost of the South Kona fire was, all told, a little over $2,200.00. The remainder, above $2,000.00, was paid out of the regular appropriation of the Board of Agriculture and Forestry.

NORTH KONA FIRES.

The fires on the Bishop Estate lands in North Kona, also in February, were attacked as soon as discovered and while stubborn, were checked before much damage was done. Mr. T. C. White was in charge of this work, while Mr. F. S. Dodge, the Superintendent of the Bishop Estate, was also on the ground, remaining until the fires were under full control.

WAIANAE UKA FIRE.

The Waianae-uka fire on Oahu originated from a grass fire started by one of the Wahiawa colonists. Getting beyond contol it spread rapidly to the adjoining forest where it required the services of some five hundred men, before it was put out. Special credit belongs to the Waialua Agricultural Company which sent gangs of laborers to the fire and kept them at work until it was extinguished. The fire fighting at this fire, which occurred in March, was in charge of Mr. David Haughs, Forest Nurseryman of the Division of Forestry.

For details in regard to other forest fires during the year the reports of the Forestry Nurseryman and of the District Foresters should be consulted.

FOREST FIRE LAW.

One result of the forest fires of 1905 was that a forest fire bill was introduced in the Legislature soon after the return of the Superintendent of Forestry from Hawaii, modelled upon and closely following that prepared by the U. S. Forest Service for California. This bill became law with one or two slight changes and now stands on the books as Act 71 of the Session Laws of 1905. A bill to provide a fund of $5,000.00 per annum, to be used only in case of emergency, was introduced but failed to pass. Consequently there is at present no money available with which to carry out the provisions of Act 71.

It is believed, however, that much was accomplished by getting enacted a forest fire law providing for a fire fighting organization and establishing penalties for the careless or malicious starting of forest fires.

FIRE WARDENS.

Acting under the theory that the best way to fight forest fires is to prevent them, the Board has appointed district fire wardens throughout the Territory, who have agreed to see that the law is enforced and who will take active steps when necessary to suppress fire. Being in most cases plantation or ranch managers, the fire wardens are in a position to call out a force of men without delay, and as it is usually to their personal interest to stop fires at once, speedy action in most cases is assured. The present condition is, however, far from satisfactory and some arrangement should, as soon as possible, be made to provide a fund for the payment of fire fighters. In no other way can a really efficient organization be built up.

A list of the Fire Wardens appointed under the law, with their respective districts appears elsewhere in this report.

Fire warning notices in English, Hawaiian, Portuguese and Japanese have been prepared by the Chief Fire Warden and caused to be generally posted throughout the Territory. They are printed on cloth and give certain rules to be observed regarding the use of fire, with the sections of the law containing the penalties provided for allowing fires to escape. In general make-up the notices follow those in use in Maine and New York. A copy of the English notice is given on another page of this report.

A circular is now in preparation which will contain suggestions in regard to forest fire fighting, based on methods which experience has proved to be of value elsewhere.

GENERAL FOREST WORK IN THE TERRITORY.

ARBOR DAY.

Outside of the work of the Division of Forestry several matters of forest interest deserve to be recorded. The one of perhaps the greatest popular interest is the inauguration of an Arbor Day celebration.

The observance of this semi-holiday was this year actually started by the action of the then Superintendent of Public

Instruction, Mr. J. C. Davis, who fixed Friday, November 3, 1905, as Arbor Day for the schools. This action awakened general interest and led the Governor to issue a proclamation officially setting apart the day and recommending its observance. Governor Carter further showed his interest in giving the first Hawaiian Arbor Day a good send-off by generously offering to contribute half of a fund to enable a prize of $5.00 to be given in each of the 154 public schools in the Territory, to the grade planting on Arbor Day the tree which as the result of being well cared for, should be in the best condition at the end of the year. The other half of the fund was raised by subscription and much interest was thereby aroused in the different schools. The trees for planting were for the most part furnished by the Government Nursery. Mention has already been made of a press bulletin of information issued at the time to assist the teachers in making the tree planting a success.

Arbor Day was generally observed throughout the Territory, both in the schools and by the general public. The interest awakened should be productive of much good.

FOREST UTILIZATION.

Koa Lumbering.

In the way of forest management it is a pleasure to record that the project of lumbering Koa on the Bishop Estate land of Keauhou is progressing favorably. Actual work in the woods has not yet begun but plans in regard to the milling and shipping of the logs are well advanced.

Ohia Telephone Insulator Pins.

Another good sign is that a firm in Hilo has undertaken the systematic manufacture of telephone insulator pins from Ohia Lehua. From trials made in the islands, Ohia seems peculiarly adapted for this use. It is hoped that the industry will prove a permanent and profitable one.

Ironwood Ties.

Through an arrangement brought about by the Superintendent of Forestry, the Oahu Railway and Land Company secured in November, 1905, a lot of about 200 Ironwood *(Casuarina equisetifolia)* railroad ties, which will be laid in different parts of the line and tested under a variety of conditions, both with and without coatings of preservative solutions. These experiments will give valuable data and should the ties prove a success, as is expected, will lead to the establishment by the Railway of plantations of this tree.

Later when the Tantalus forest comes to be thinned, it is expected that other similar tests will be made with several of the Eucalypts and with other woods.

The Oahu Railway and Land Company is also trying experiments with various preservatives, on ties imported from the Coast.

Black Wattle.

A very encouraging example of a forest plantation put to commercial use is the experiment made by Mr. Jared G. Smith, in cutting the Black Wattle *(Acacia decurrens)* grove on the upper portion of the Agricultural Experiment Station grounds. The trees in this grove, which was a part of the original Tantalus forest, were mature and had begun to die. They were accordingly cut and prepared for market, careful record being kept of the amounts of wood and bark obtained. Some of the bark was sent to tanneries on the Coast, the rest sold. The results of this experiment indicate clearly that for certain situations Black Wattle is a very valuable tree, which would well repay planting. Full data in regard to the experiment are to be given in a Press Bulletin of the Hawaii Experiment Station, now in press.

Permits for Dead Wood.

At the request of the Commissioner of Public Lands, the Superintendent of Forestry, in March, drew up a form of permit granting the free use of limited quantities of dead wood on government land, for fuel and other purposes. Several permits have been issued, after being first passed on by the Superintendent of Forestry, a procedure suggested by the Commissioner of Public Lands.

Timber Theft.

In one or two cases of theft of timber on government land the trespassers have been convicted and fined under Section 3044, Chapter 202, of the Revised Laws. It has been suggested by the Attorney General that there should be more specific legislation to cover this class of offenses.

Forest Extension.

A number of the Sugar Plantation companies in the Territory annually devote regular sums to the establishment and care of forest plantations. The usual amount of work has been done in 1905, but so far as is known no new forest plantations on a large scale have been undertaken.

It is understood, however, that several plantation companies have such work in mind for 1906.

Street Tree Planting.

In Honolulu there has been a decided movement toward city improvement during the fall of 1905, which has resulted in the establishment of numerous local improvement clubs and incidentally to more or less street tree planting, especially in the Kaimuki section. In this work the Division of Forestry has lent a helping hand, by supplying trees from the Government Nursery.

Rubber.

Interest in rubber has led to the establishment of several rubber plantations on the windward side of Maui, which from all accounts appear to be in a thriving and prosperous condition.

For the most part the plantations consist of the Ceara Rubber *(Manihot glaziovii)*, but arrangements are being made to plant Central American Rubber *(Castilloa elastica)* and Para Rubber *(Hevea brasiliensis)* as well.

Rubber culture is as yet in the experimental stage in Hawaii, but if present indications can be relied on, success seems assured. It is interesting to note that the beginning of the Hawaiian rubber industry dates from the sending out of Ceara Rubber seed by the Hon. J. Marsden, during his term as Commissioner of Agriculture, about twelve years ago.

FUTURE PLANS AND RECOMMENDATIONS.

To sum up the plans for the coming year, of which mention has been made above:

As in the past two years the creation of new forest reserves will still hold first place. With the setting apart of those now pending and projected the more important forest areas in Hawaii will have been included in the chain of established reserves. The year 1906 should see most of these areas fall into line.

Next in order and importance, and really forming a part of the creation of the forest reserves, is the establishment of a proper system of forest reserve administration.

During the first year of the Division of Forestry the need for rangers was not urgent. Few reserves had then been created. But at the end of 1906 the outlook will be wholly different. Already four large and one small forest tracts have been set apart, while during the coming months it is certain that the total area of the reserves will be very largely increased. The forest reserves to be made in 1906 are fully as, if not more, important than those already established. To properly administer them so that they may be made of the greatest possible benefit to the Territory requires a force of forest rangers.

It is none too soon to begin to agitate this question, for to secure a truly efficient forest reserve service the rangers must be a paid staff under the direct and complete control of the Board. Such a system of reserve administration cannot, of course, be put into effect until money is made available through an appropriation by the Legislature, but during the coming year a campaign of education showing the need and necessity of such action should be begun which will have its effect in the spring of 1907.

During 1906 it is the intention of the Division of Forestry to follow up its offer of Practical Assistance to Tree Planters, contained in Circular No. 1, and as far as may be to push this branch of the forest work. In the same connection it is expected that during the year one or more bulletins dealing with existing forest plantations in the Territory, will be prepared and published.

So far as the more pressing demands of the work allow, the other activities of the Division of Forestry will be continued, especial attention being paid to the gathering of notes and other data that will be of use in the subsequent work of the Division.

There is no lack of forest work to be done in Hawaii which will result in practical benefit to the Territory, and it cannot be too often said that the whole object of the forest work here, as elsewhere in the United States, is to accomplish results of practical value to all the people.

It is true that the benefits resulting from the protection of the forests on our watersheds are not as tangible as those in some other departments of governmental work, and that the money returns from forest plantations are not to be got for a number of years, but these facts should not blind one to the results which are attained in the end. The final accomplishment of certain definite and eminently practical aims is what the Division of Forestry stands for, and although the goal may not be reached for many seasons, a systematic and organic plan underlies all the work. The forest reserves are not made because they are interesting or beautiful, or because they contain certain rare trees, but because they help to make available for use the water in the streams whose drainage basins they cover. So with the planted forests. What the Division of Forestry is striving for is the best economic return for the money invested, through the production of trees of value for commercial purposes.

For the attainment of these ends it is essential that the support of an active and intelligent public sentiment be assured. The Division of Forestry will do its utmost to meet and solve the forest problems that arise. With the confidence and support of the people of the Territory it may hope to do work which will be not only of real and lasting benefit to the Territory as it is today, but which will also help in bringing in that era of greater prosperity that we believe the future has in store for Hawaii.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry and Chief Fire Warden.

Report of the Forest Nurseryman.

Honolulu, Oahu, Dec. 31. 1905.

Ralph S. Hosmer, Esq.,
Superintendent of Forestry,
Honolulu, Oahu.

Dear Sir:—I herewith submit a report of the work done at the Government Nursery, the Nuuanu Station and at Tantalus Forest, for the year ending December 31st, 1905.

THE NURSERY.

COLLECTION AND DISTRIBUTION OF SEED.

Thirteen varieties of native tree seed have been collected by Mr. Robert Hind, Puuwaawaa. This seed was all from indigenous trees and has been used mostly for exchange purposes, samples having been sent to the Bureau of Forestry, Manila; Public Works Department, Guam; Mr. Newton B. Pierce, in charge Pacific Coast Laboratory and Plant Improvement Gardens, Santa Ana, Cal.; and to others.

Seed for sale and free distribution has been collected on Tantalus and around the city, and although the demand has not been so large as expected, a number of people have taken advantage of the offer of this Board to supply useful forest and ornamental tree seed at prices covering the cost of collecting and sorting.

Seed has been imported from Japan, Australia and California. A number of varieties of Eucalyptus new to the Islands have been imported from Australia and are being tried on different parts of the Islands. The Jarrah *(Eucalyptus margenata)*, which is one of the most valuable timber trees in Australia, is again being experimented with. Previous experiments with this tree were not successful, but by trying it at higher elevations on the different islands there may yet be found locations where it may be successfully grown. It has been tried in different districts at elevations from sea level up to twelve hundred feet. The object of keeping on hand fresh seed of the most valuable forest and shade trees is to encourage tree planting whether it be for forest, windbreak, shade or ornamental purposes.

Trees for use on the grounds of public institutions, such as schools, parks, etc., are supplied free of charge, as are also trees for street planting. Homesteaders who have acquired Government land and are required to plant a certain number of trees per acre are also supplied free of charge. To others the seed is offered for sale at prices just covering the expense of collecting and sorting. Press Bulletin No. 1 of this Division gives the varieties of seed kept on hand. All seed whether received from abroad or collected on the islands, is tested before it is offered for sale or given away gratis. The new testing house erected during the year has proved to be of great benefit in testing and also in experimenting with imported seed and valuable seed collected here.

The assistance of the Division is given to those who wish to import seed or plants from abroad. Current catalogues of the leading seed and nursery firms of the United States, Europe, the Australian Colonies, Japan and Ceylon are kept on file for the benefit of those who may wish to consult them.

Many inquiries have come to this office for information regarding the best kinds of rubber trees to plant, where seed can be procured, etc. About 14 lbs. of Ceara Rubber seed *(Manihot glaziovii)* was collected in and around the city and found a ready sale at twenty cents per ounce. A number of the applicants for rubber seed were referred to Mr. Jared G. Smith of the U. S. Experiment Station, who has a special rate from several firms in Europe for Ceara and other rubber seed.

Congressional Vegetable Seed.

During the years 1904 and 1905, a large quantity of congressional vegetable seed was received from Delegate Kalanianaole and distributed by this Division.

A notice in the daily papers that congressional vegetable seed would be sent to any one applying for same brought many applicants from all over the Islands.

Experiments with Rubber.

Twenty five Central American rubber trees *(Castilloa elastica)*, the seed of which was collected by Prof. Koebele while in Mexico some two years ago, are being experimented with on a piece of land in Moanalua gulch, kindly granted by the Hon. S. M. Damon. As there was no suitable land controlled by the Board for experimenting it was deemed advisable to ask Mr. Damon to let us have land in Moanalua gulch for that purpose. Our request was at once granted, and a piece of land was selected at an elevation of about 400 feet above sea level, and situated about one and a half miles above the Polo ground.

A wire fence was erected around the plot selected, and the twenty-five trees planted in rows fifteen feet apart each way. The trees were planted on November 1st and are doing exceedingly well. The object in view is to get the trees well started so that cuttings or seed may be got from them to supply the local demand and save much money to those who may be sending abroad for seed or plants.

GROWING AND DISTRIBUTION OF PLANTS.

The object of keeping tree seedlings on hand for sale and free distribution is to supply plants that the private nurseries do not keep in stock. The selling prices of plants from this nursery just covers the cost of raising. The large majority of the plants, however, are given away free. All the schools of the Territory are on the free list, also the Improvement Clubs for street planting. Homesteaders who have acquired Government land are also given a limited number, on application.

The success of the first Arbor Day held in the Territory was largely due to the assistance given by this Division in supplying trees for that day to all the schools of the Territory and others who applied for them, free of charge. The Improvement Clubs of the city are also drawing heavily on our stock. The Waialae, Kaimuki and Palolo Improvement Club has had about three thousand trees raised at the Nursery for use on the streets of the tree districts covered by the Club. Over one thousand trees of different kinds have been given to the homesteaders in Palolo Valley to be used mostly for shelter belts. Some five hundred trees of various kinds have been sent to Guam.

At intervals of from two to three months the writer visits all the private nurseries of the city for the purpose of ascertaining the line of plants they intend keeping in stock for sale. By doing this we are able to avoid coming in competition with them and we can also give information to those who call at this nursery seeking such plants as ferns, palms, shrubs, fruit trees and vines.

Distribution of Plants from the Government Nursery for the Year 1905.

	Forest.	Fruit.	Ornamental.
Given away	7500	100	3909
Sold	3500	60	1090
Totals	11,000	160	4999—16,159

The sale of plants has resulted in receipts of $124.00 and the sale of seed $107.22, which has been paid into the Treasury as a realization.

EXPERIMENTAL WORK.

By exchange we are continually receiving seed of new and rare plants from the Forestry Department, Manila; Public Works Department, Guam; Mr. Newton B. Pierce of the Pacific Coast Laboratory, and we have lately started an exchange with the Acclimatization Society of Queensland. Through these agencies we expect to receive many valuable additions to our flora.

Samples of most of the imported tree seed have been sent to Mr. F. W. Carter of the Parker Ranch, Mr. Louis von Tempsky of the Haleakala Ranch, and Mr. Walter G. McBryde, Eleele, Kauai, and others. The above named gentlemen have taken a great deal of interest in the forestry movement and have done much valuable work.

ADVICE AND ASSISTANCE.

Twenty requests to visit places in and around the city for the purpose of giving advice and assistance have been acted on. The nature of the advice and assistance being as follows: Moving large trees, planting and care of trees, pruning, street planting, etc.

Arbor Day.

Arbor Day which took place on November 3rd, was generally observed throughout the Islands, and plants to the amount of 2846 were distributed among the schools of the Territory. The following is the number of schools by islands and the number of plants sent out for Arbor Day planting:

Islands.	Schools.	Plants.
Oahu	24	425
Hawaii	36	1590
Kauai	7	121
Maui	13	478

Molokai	4	206
Lanai	1	26
Parks, private schools, etc.		708
Total		3554

The Waialae, Kaimuki and Palolo Improvement Club held its first Arbor Day on Thanksgiving Day, Novermer 30th, when the members of the Club turned out and planted about three hundred trees on the streets covered by the Club. A large quantity of Algaroba seed was also planted on vacant lots. Considerable tree planting has been done since by the members of the Club.

NURSERY GROUNDS.

The labelling of the trees in the Nursery grounds has been much appreciated by tourists and others visiting the Nursery, and with the use of the Library, which contains many valuable works on Botany and other subjects, many visitors have spent a very pleasant and instructive hour viewing and reading about the different trees to be found growing here.

A number of classes from the public schools of the city have visited the Nursery for botanical studies.

The old green house has been removed and a new testing and propagating house built. Other general improvements have been made, such as improving sidewalks, levelling and grassing over parts that required attention, etc. Sheriff Henry has assisted us considerably in granting the use of the prisoners to work in the Nursery. Without their help it would have been impossible to keep the grounds in good condition, owing to the limited help at our disposal.

A new herbarium cabinet has been built and put in the seed room, but I regret to say that the additions to the herbarium collection have been small. Although the botanical notes on the flowering and seeding seasons of the different plants are being kept up, my time is too much taken up with other matters to give the time and attention these subjects require.

FOREST AND BRUSH FIRES.

During the year we have had several forest and brush fires on Oahu, the most serious one being the fire in March, which started on the land of one of the Wahiawa colonists and spread into the forest of the U. S. Military Reservation. Had it not been for the timely action of Mr. W. W. Goodale, Manager of the Waialua Agricultural Co.; Mr. E. K. Bull, Manager of the Oahu Plantation; Mr. W. A. Buick of the Dowsett Ranch; Mr. B. O. Clark and others in sending men and assisting in putting the fire out it might have been very serious indeed.

The water supply for the Waialua plantation, Wahiawa Colony and, in part, the Oahu plantation, is got from this watershed, part of which was burned. At your request I was on the ground to take charge and assist in putting out this fire.

A small fire, mostly brush, was started at the top of Palolo Valley early in the year, one on the east side of Kalihi Valley in July, and one on Pacific Heights, also in July. At each of those fires members of the staff were present and assisted in putting them out. The fires did small damage, each one being put out before it had time to spread into the dense forest.

NUUANU FOREST STATION.

Two men have been employed during the year. Their principal work being to keep in check the vine "Maile Pilau," which is a great pest in the upper part of the valley. The men also fill up the spaces around the roots of the young trees caused by the swaying of the trees during heavy winds. This is very necessary work, for leaving this space open, and allowing the air to get at the roots would be very apt to cause the death of many of the younger trees. In many cases, too, the trees themselves have to be straightened up.

The general condition of the forest has improved considerably during the last year and young trees that could scarcely be noticed above the grass, at the beginning of the year, are now from three to eight feet high and are in a healthy condition. This does not apply, however, to the wind-swept ridges close by the Pali. In such places, although planted at the commencement of the work in Nuuanu some eight years ago, the trees are small and stunted, some of them hardly visible above the Hilo grass.

The trees in the six experimental plots, with close planting, planted during the months of March and April, 1904, are also in a healthy condition. Plots 2, 4 and 6 planted in *Eucalyptus robusta*, 3x3 ft., 4x4 ft., and 5x5 ft., respectively, have done better and grown more evenly than the alternate plots planted in *Casuarina*. The plants in the three plots mentioned have made about the same average growth and the trees are from one and a half to two inches in diameter at the butt, and from six to nine feet high. Plot No. 1 is planted in *Casuarina tenuissima*; and Nos. 3 and 5 in *Casuarina equisetifolia*; 3x3 ft., 4x4 ft., and 5x5 ft., respectively. On Plot 1 the trees are from ¾ to 1¼ inch in diameter at the butt and from three to seven feet high. Those on Plots 3 and 5 are very irregular in growth, the majority of the trees not being over 4 feet high, while some reach eight and ten feet in height, with diameters at the butt of from ½ inch to 2½ inches.

TANTALUS FOREST.

During the year twelve cords of dead wood have been sold, the price received being seventy-five cents per cord on the stump. The trees being far apart and the great difficulty of getting at them owing to the dense growth of Lantana, is the reason of the low price.

An old trail commencing from the bend of the road below the forester's cottage, and crossing the Makiki Gulch to the top of ridge on the opposite side, has been cleared. The trail passes the patch of fruit trees alongside the stream, planted by the writer about ten years ago. There were planted at that time thirty-seven grafted Litchi nut trees *(Nephelium litchi)*, twenty-four Florida peaches and four varieties of Fig trees, two of each. Two or three years after planting, at the request of the then Commissioner of Agriculture and Forestry, a number of the trees were lifted and sent to town. On September 18th, 1905, the writer, with one of the laborers from the Nursery, inspected and cleared away the vines and grass from the trees. Although almost covered with Ipomoea vines, most of the peaches and four Litchi trees were still alive. One of the Litchi trees is ten feet high and has a spread of branches about fifteen feet and is in a healthy condition; the other three Litchi trees, although smaller, are also in a healthy condition.

In a small gulch on the mauka side of the road at the bend just above Commissioner Thurston's place, three kinds of Olive trees were planted about ten years ago. The number and names are as follows:

26	*Olea*	*polymorpha,*
25	"	*manzanillo,*
50	"	*nevadillo.*

Many of these have perished, but there are still alive twenty-five of them, some being ten feet high and looking healthy. The brush has been cleared away so that they will have a chance to grow. A little below the Olives on the same side of the road are to be found several trees of the Japanese Chestnut, now in fruit, planted at the same time. The piece of land on which the Chestnuts are growing was, I am informed, sold several years ago to Mrs. Foster.

I would suggest that such valuable trees as these be kept clear of brush and vines, should they be on Government land.

Respectfully submitted,

DAVID HAUGHS,

Forest Nurseryman.

Reports of District Foresters.

Early in January the Superintendent of Forestry sent to each of the District Foresters a copy of the following letter. The reports received in response thereto are given below:

LETTER FROM THE SUPERINTENDENT OF FORESTRY.

Honolulu, Oahu, Jan. 4, 1906.

Dear Sir:—In accordance with the terms of the law creating the Board of Agriculture and Forestry an annual report for the calendar year 1905 is being prepared by the members of the Board staff. As a part of the report of the Division of Forestry I wish to include statements from the several District Foresters throughout the Territory. It is expected that the manuscript of the report as a whole will go to the printer early in February. The reports from the District Foresters should therefore, if possible, be submitted to me on or before February 3rd.

As one of the objects of the publications of the Board is to record and make available the results of forest work done in the Territory, I should be glad to get information on the following points:

Seeding habits of native and introduced trees: Season and period of seeding, recurrence of seed years, age and size at which seed bearing begins, notes on species seeding heavily in 1905, etc.

Dates of introduction of valuable trees and shrubs: Historical notes as to the name of the person by whom, and the place and time at which valuable trees and shrubs were introduced into your section. Dates of forest plantations, large wind brakes and extensive road-side planting are also in order.

Injuries to the forest during 1905: Notes on forest fires, duration, type of fire, area burned over and damage; notes on old forest fires, dates and approximate areas; insect injuries, ex tension or decrease of damage, new pests noted; injuries from fungi and other causes.

Forest planting in 1905: Forest Plantations, wind brakes or road-side planting during the year; location, area, kinds of trees, etc.; prospects for future planting.

Forestry in general: Notes of interest on any forestry matters.

In general character and scope the 1905 report will conform to first report of the Board, issued last spring. May I ask you to contribute a short statement dealing with one or all of the above subjects?

Thanking you in anticipation for your contribution, I am,

Very sincerely yours,

Ralph S. Hosmer,
Superintendent of Forestry.

REPORT OF MR. FRANCIS GAY.

Waimea, Kauai.

Makaweli, Kauai, Jan. 27th, 1906.

Mr. R. S. Hosmer,
Honolulu, Oahu.

Dear Sir:—In answer to your letter of the 4th inst. I would state that since my last report to you we have put in considerable time killing off the wild cattle from the forest lands, the expense of which has been borne by our firm of Gay and Robinson, on the lands controlled by us, and by the Knudsen Brothers, on the lands controlled by them.

Fencing on these lands is not necessary at present, as the adjoining pasture lands have no cattle running on them.

I found it necessary to make quite a number of trails, or horse paths in the mountains to facilitate the hunting and thereby was able to kill off about a hundred head of cattle, and this season when the dry weather sets in, from July to October, I propose to press the hunting into the swampy country as far back as the cattle run. This hunting will have to be done on foot as a great part of last year's was.

Our camps will have to be moved back further into the swamps, and the hunting will be a much harder task than that last year was.

In regard to forest planting I would say that our mountains are so well wooded with native trees, that I think it is not necessary to plant foreign trees, but if there was a sum appropriated for that purpose, some foreign trees would be an advantage.

In regard to forest fires I would state that for years our system has been to pay well every person who is present at, and helps to extinguish a fire. He is paid out of a fine imposed on the person starting the fire, and as the people are well paid they all turn out on the first sign of a pasture or forest fire.

Only one small forest fire occurred last year and that was quickly extinguished.

I have not noticed any new pests, nor injuries from fungi or other causes, and our forests look better now than they have for some years back, owing to the cattle being reduced.

As I stated to you in my last report our lowlands are well wooded with Algaroba, which was started years ago by ourselves and other land holders in the district, and now we are all reaping the benefits of our labors.

Yours very truly,

FRANCIS GAY.

REPORT OF MR. GEORGE H. FAIRCHILD.

Puna, Kauai.

Kealia, Kauai, Feb. 3rd, 1906.

R. S. Hosmer, Esq.,
Superintendent of Forestry,
Honolulu.

Dear Sir:—In reply to your letter of the 4th ult., I have nothing to offer in the way of a report beyond that which has been already submitted by others pertaining to the establishment of a forest line across the lands of Olohena, Waipouli, Kapaa, Kealia, Anahola and Kamalomaloo.

Nothing has been done in the matter of observing the "seeding habits of trees;" no new trees have been introduced; no forest fires to record or other injuries beyond those effected by cattle and old established pests.

The early fencing of the boundary line protecting the forest from cattle will be an important factor in forestry in this district where firewood is becoming scarce and the forest fast receding into the watershed.

I have noticed in a few places where the cattle have been kept out by ditches or other obstacles that many young thrifty Ohia trees are springing up. That the early establishment of the forest fence must precede all other efforts is self-evident and, to my mind, constitutes the prime matter for consideration in this district.

Respectfully submitted,

G. H. FAIRCHILD.

REPORT OF MR. FRANK SCOTT.

Koolau, Kauai.

Kilauea, Kauai, T. H., Jan. 27, 1906.

Mr. Ralph S. Hosmer,
Superintendent of Forestry,
Honolulu.

Dear Sir:—Your favor of the 4th inst. received and contents noted. In regard to a report from the District Foresters I would say that I know very little about forestry. I have got a little data on forest fires in this district which may be of some interest to you.

In 1886 there was a fire on Mahale, on the edge of Kalihiwai gulch, which lasted two days and burned over 150 acres. There were two in 1890, one on Kamookoa ridge, which lasted four days and burned over 200 acres; the other one was on Pohakualeale, which lasted five days and burned over 300 acres. In 1904 there was a fire on the edge of Mooloa gulch, which lasted about one week and burned about 250 acres. The trees that were destroyed were principally Ohia Lehua.

There were planted around Kilauea about 17 years ago several clumps of trees, in all about 20 acres, principally Ironwood and Eucalyptus, both of which seem to do well. Last year Mr. Moore tried to interest the Japanese in planting some trees in commemoration of the fall of Port Arthur, but the scheme failed to mature.

Very sincerely yours,
F. Scott.

REPORT OF MR. A. M. NOWELL.

Waialua, Oahu.

Waialua, Oahu, Feb. 2, 1906.

Mr. R. S. Hosmer,
Superintendent of Forestry,
Honolulu, Oahu.

Dear Sir:—In response to your letter of Jan. 4th, I would say that I had hoped and expected, this year, as I so stated in my last year's report to you, to be able to report something definite in the way of the establishment in the Waialua District, of Forest Reserves, Nurseries or Planted Forests.

I am, however, not able to do this as there has been nothing actually accomplished, in any of the above lines, during the past year, though I take pleasure in referring to the inspection made by you and myself, last October, of the upper Halemano and Kawailoa lands, and the present line of the forest fence above these lands.

The chief evils which could befall these forests of the Koolau Range, by far the most extensive and valuable forests in this district, are those of destruction. 1st by *fire*, 2nd by *cattle*, 3rd by *injudicious cutting*, and 4th by *injurious insects*.

The Waialua Agricultural Company, Limited, which controls these lands, has finally succeeded in effecting the removal by their owners of the cattle which have for many years been ranging there. This accomplishment at once minimizes the danger from both *fire* and *cattle*, as the greater part, if not all of the fires which have occurred on these upper lands in the past few decades have been caused by cattlemen.

As to danger from *injudicious cutting*, Mr. Goodale, manager of the Waialua Agricultural Company, Limited, is very thoroughly aware of the *immense value* to his plantation of the mountain water which he has conveyed from the watershed to the canefields, and not only this, but he also realizes that the preservation of these forests means the preservation of the streams, the waters of which the plantation is using. I therefore consider that danger to these forests from injudicious cutting, for the present at least, is also minimized.

As to danger from *injurious insects*, I have noticed that areas exposed to the ravages of cattle are more susceptible in their weakened condition to the attacks of insects, and I therefore conclude that with the successful removal of all cattle from these lands, the danger from insect pests will be, at least, lessened.

Injuries to the forest during 1905: Last March, a fire started in grass land at Wahiawa, soon got beyond control, and before it was finally overcome had burned over an area of about 800 acres on the Koolau side of the Wahiawa Tableland. Of this area, only about 200 acres is in Waialua District, the greater portion being in Waianae Uka.

Of the total area burned, it is estimated that 500 acres was forest, the remainder grass land. The fire was fought by men furnished by the Waialua Agricultural Company, Limited, the Wahiawa Water Company, and the Oahu Sugar Company. The Waialua men were sent to the scene by Manager Goodale, immediately on the realization that they were needed, and they worked under the direction of Mr. George Watt, Head Overseer for the Waialua Agricultural Company, Limited, and Mr. David Haughs, Forest Nurseryman for the Board of Agriculture and Forestry.

Among others who were instrumental in suppressing this fire were Mr. Buick and several of the land owners of the Wahiawa Settlement.

This fire burned for several days and at times was making such headway that it threatened an immense area of heavily wooded forest. Its progress was finally stopped by the combined efforts of a large number of men who cut a swath 20 feet wide ahead of the advancing fire.

Rainfall: The rainfall in this district, at about 30 feet elevation, for the past five years, has been as follows:

1901, 35 inches; 1902, 27 inches; 1903, 16 inches; 1904, 66 inches; 1905, 18 inches; making an average yearly rainfall of 32 inches.

Five miles inland, at an elevation of 1,000 feet, the average yearly rainfall is about 65 inches or double that at the 30 foot elevation, while at ten miles inland there is approximately 125 inches of rain every twelve months, or 4 times as much as at the lowest elevation quoted.

Outlook for 1906: I believe that something should be done this year in the way of reforestation of the lands just below the present forest fence. In that case a nursery should be established at once. I believe that satisfactory arrangements could be made with the Waialua Agricultural Company for the carrying on of work of this kind on lands controlled by them. There are certainly a good many acres of lands, not now in forest, that will never be planted with sugar cane. Why not make them forest?

Respectfully submitted,

A. M. Nowell.

REPORT OF MR. JOHN HERD.

South Koolaupoko, Oahu.

Maunawili Ranch,

Waimanalo, Oahu, Jan. 24th, 1906.

Ralph S. Hosmer, Esq.,
Superintendent of Forestry,
Honolulu.

Dear Sir:—In compliance with your request, I herewith submit a statement of forest conditions in this section for the past year.

Seeds: As a rule, the trees in this section seed during the months of July and August. Unfortunately the seed of the native Koa in this district is entirely destroyed by a small worm which attacks the pods. The same trouble applies also to the seeds of Pride of India. Casuarina (Australian Beef Wood) has been seeding abundantly. *Grevillea robusta* is backward in this respect, seven-year old trees having borne so far very few seeds.

Trees Set Out: Since my last annual report there have been set out in this section 2,323 trees, mostly of economic importance, of which 1,500 are of the native Koa. This makes a total of 17,233 trees planted out by me on the Maunawili Ranch property under instructions of Messrs. W. G. Irwin and W. M. Giffard, since 1902. A number of trees set out as above during the past year were for the purpose of filling up "blanks" from former plantings.

New Varieties Introduced: A large number of trees, etc., of economic value have been introduced into this section by Mr. W. M. Giffard, among which are Teak *(Tectonia grandis)* from India, Mangosteen from the Strait Settlements, varieties of Rubber, Manila Hemp *(Musa textilis)*, *Monstera deliciosa*, *Anona muricata* and *Artocarpus integrifolia*. All the above were propagated from seed by Mr. Giffard and sent to this section for experimental purposes.

Pests: The Alligator Pear trees are being attacked by a small beetle borer, and large numbers of these have been destroyed, supposedly, by this means. It is, however, quite possible that the *real* cause of their destruction is some fungus which attacks the roots and renders the tree unhealthy. This latter condition in turn would invite the work of the borers referred to. Until I can get this matter determined by either a plant pathologist or an entomologist I cannot fully decide the question. It is important that these and other troubles caused through fungi on this ranch and in this district be investigated by the department having such matters in charge. Other pests in the district are the worms which destroy the *Acacia koa* and other tree seeds, and a fungus which attacks the fruit of the Mango to the extent that no fruit has come to maturity for the last four years. Another fungus which is liable to become very serious is that which attacks the berries on coffee trees and also the leaves. The pests above referred to exist on other islands besides this one, and it is time steps were taken to have a plant pathologist determine these fungi and suggest remedies—otherwise large areas of land planted with trees of economic value are liable to become unproductive in the near future.

In addition to the above pests I might mention that of the common Guava, which has over-run this district. This tree has been increasing rapidly during the past few years along the windward side of this island, and in this district is killing out large numbers of the Ohia Ai, Ohia Lehua and Kukui trees. It was formerly the custom in this section to lease out to Chinese and others areas of land covered with Guava trees for the purpose of making charcoal from the same. The result of this system was temporarily of financial benefit to the owner of land, but it eventually resulted in causing the roots of the Guava trees so cut to increase in enormous quantities through the suckers produced from the roots, and thereby make the land absolutely impassible to the rancher in caring for the cattle roaming over the same. It has also resulted in ruining the feed upon which the cattle subsist, causing the grasses to sour, and the cattle to get in poor condition. After a few months' experience in this district I came to the conclusion that it did not pay to cut Guava trees for charcoal or other purposes unless the roots are thoroughly eradicated from the soil. In sections where the charcoal burner was not allowed to work the original Guava trees have grown to quite a height without suckering from the roots and are far enough apart in themselves to allow a passage for man and beast between and under them. I find also that these trees produce much larger fruit than the scrub Guava, caused by the suckering of the trees which have been hewn by charcoal burners. Upon my recommendation, the owners of the ranch have for the past two years refused to rent out any Guava lands to the charcoal burners.

Among other pests similar to Guava is the Lantana, which has also fairly over-run portions of the district. In this particular section, however, I have been able to keep it down to a considerable extent, and it would be well if other property owners in the neighborhood did likewise, notwithstanding the fact that there is a possibility of its not spreading as much now as in the past, because of the insect enemies which have been introduced through the Territorial Government for preventing the further propagation of the seed.

Fencing: Since my last report three small forest reserves on the Maunawili Ranch have been fenced in by order of its owner. This was done in order to protect the native forest near the foothills.

Respectfully submitted,

JOHN HERD,
Forester.

REPORT OF MR. G. C. MUNRO.

Island of Molokai.

Molokai Ranch,
Kalae, Molokai, Feb. 1, 1906.

Mr. Ralph S. Hosmer,
Superintendent of Forestry,
Honolulu.

Dear Sir:—In answer to yours of January 11th, I am sending a few lines on our forest and regret that I have been able to spend little time in the forest region and so have little to tell.

The protected forest of Molokai continues to improve in condition, the growth on the partly denuded areas being especially noticeable, ferns and young trees in some places forming a dense covering where a few years ago the ground was almost bare. There is a great need of some quick growing, self-spreading trees to make more variety in the forest. Many have been tried but none found altogether satisfactory. No great area of trees has been planted on Molokai in the past year, probably not more than a few thousand trees. In 1906 larger plantations will likely be made; several acres of Black Wattle will be planted in one location.

Yours very truly,

G. C. MUNRO.

REPORT OF MR. C. B. WELLS.

Wailuku, Maui.

Wailuku, Maui, T. H., Jan. 23, 1906.

Mr. Ralph S. Hosmer,
Superintendent of Forestry,
Honolulu.

My Dear Sir:—In reply to your esteemed favor of the 4th inst., I regret to say I have nothing of value to contribute for your report.

There have been no injuries to the forest during 1905, nor have any steps been taken in the way of forest planting.

I desire to go into forest planting for the Wailuku Sugar Company and have been waiting many months for you to visit Wailuku in order to get your valuable opinion as to what is best to be done and to act in accordance with your advice.

Very truly yours,

C. B. WELLS.

REPORT OF HON. H. P. BALDWIN.

Forester at Large, Maui.

Puunene, Maui, Feb. 2nd, 1906.

Ralph S. Hosmer, Esq.,
Superintendent of Forestry,
Honolulu.

My Dear Sir:—I have not been able to write much of an article for your Annual Report, for lack of time. Moreover, I am not well posted and cannot now give much information on the two first items you requested me to write upon, to-wit:

"Seeding Habits of Native and Introduced Trees."
"Dates of Introduction of Valuable Trees and Shrubs."

I will endeavor to post myself more thoroughly on these two subjects, before your next Annual Report comes out.

Forests during 1905: The rainfall was quite heavy during the summer of 1905, especially in the mountain forests.

The total rainfall in Keanae in 1905 was 247.90 inches, and 126.03 inches at Kailua, where W. F. Pogue resides. The rainfall was well distributed in both places throughout the year.

We had but few forest fires through the year. This was due very largely to the fact that the underbrush was kept wet by the rain most of the time.

Forests planted in 1905: Aside from planting several thousand trees on our sugar plantations here, but little was done in the way of forest planting.

The forest reserve fence is now completed and we will take steps this year to renew the forests, where the mountain slopes have been denuded of trees.

Forests in general: Carrying out the proposition of the Forest Reserve Agreement, between the Government and the Hawaiian Commercial and Sugar Company, Paia and Haiku Sugar Companies, to reserve and protect certain of the forest lands of East Maui, the above mentioned plantations have completed the fence enclosing said forest, and also a large tract, not included in said forest reserve, on the "makai," or sea side, of the forest, so that all animals are kept out of the forests.

W. F. Pogue, the superintendent of our large water aqueducts, has general charge of said forests, with instructions to keep the fence in repair. The fence runs from Halehaku Gulch to the eastern terminus of our so-called Koolau aqueduct in Nahiku. This fence was built by the above mentioned plantations last year, and I am happy to say that already the young forest trees are starting to grow and thrive, where the trees had been destroyed by cattle, horses and forest fires.

A large part of the Nahiku forest land, as you know, was cleared by the Nahiku Sugar Company to plant cane.

Two rubber companies have been organized to grow rubber trees on these lands, and a third company will, in the near future, be organized for the same purpose, so that a large part of the Nahiku lands, that were denuded of forest trees, will soon be covered again with trees, which will prove, in my opinion, a fair substitute for the dense natural forests of that district for conserving the rainfall.

It is our intention to renew the forests, as far as possible, in the districts that our irrigation aqueducts run through.

I remain, Yours very truly,

H. P. Baldwin.

REPORT OF MR. J. M. ROSS.

North Hilo, Hawaii.

Hakalau, Hawaii, T. H., Jan. 16, 1906.

R. S. Hosmer, Esq.,
Superintendent of Forestry,
Honolulu.

Dear Sir:—Yours of Jan. 4th regarding annual report of Agriculture and Forestry. In my district there is very little that I am able to report upon.

Seeding habits of Native and Introduced Trees: Introduced trees, there are none in this district with the exception of a few around plantation dwellings. Their seasons of seeding and bearing are already too well known to you to require any remarks from me.

Dates of introduction of valuable trees: There have been none introduced into this district during my time, that I am aware of.

Plantation windbrakes or roadside plantings: There are no windbrakes in this district and practically no roadside planting.

Forest fires: There have been no forest fires in this district to speak of, all of the forest being remarkably well preserved from the inroads of cattle, fires or pests. Tree ferns and underbrush are so dense right out to the forest edge that it is with difficulty you can cut your way in for any distance, even with the help of a cane knife.

Forest planting, 1905: None.

Forestry in general: Under this head the only thing that might interest you is that when the Ohia forest is cut down the Koa springs up with remarkably rapid growth. On Hakalau Plantation we had about 20 acres of Ohia forest cut down and partly cleared for cane, that is the stumps were not taken out. The larger logs are also left lying where they fell, only the smaller trunks and underbrush being burnt up. In this condition it was planted to sugar cane without any attempt at plowing. The seed cane was planted in rows dug out with mattocks. One fair crop of plant cane was harvested but when the cultivation of the ratoon crop came along, owing to scarcity of labor, it was deemed advisable to abandon the tract. The succeeding year it was noticed that a thick growth of young Koa was springing up.

That was about eight years ago. Today there is a dense forest of Koa trees, with tree ferns and underbrush as dense as the original Ohia forest. A great many of the Koa trees today will measure from ten to twelve inches in diameter, and from fifteen to twenty feet in height.

Yours respectfully,

J. M. Ross,
District Forester, North Hilo.

REPORT OF MR. J. A. SCOTT.

South Hilo, Hawaii.

Wainaku, Hilo, Hawaii, Jan. 25, 1906.

Ralph S. Hosmer, Esq.,
Superintendent of Forestry,
Honolulu.

Dear Sir:—Yours of the 4th inst. was received in which you request information regarding the forest in this section.

Seeding habits of native trees: The Koa is the most prolific seeder in this section, as whenever the forest is removed a magnificent growth of young Koa springs up, and with proper care and thinning would, in a few years, produce very valuable lumber.

Dates of introduction of valuable trees and plants: Avocado or Alligator Pear was first introduced into these islands in June, 1853, being brought here in the U. S. ship "Portsmouth," from Central America by Purser Bridge. He gave the plant to Rev. Titus Coan, pastor of the Haili Church in Hilo, who planted it in his grounds where it exists today in good condition. The Rose Apple was brought here at the same time, by the same gentleman.

I received this information from Mr. Luther Severance, who was in Hilo on the arrival of the U. S. ship "Portsmouth."

Injuries to the forest by fires: During the year 1905 there has been no damage done to the forest by fires, and credit is due to the care exercised by those in charge of the lands bordering on the same.

The rainfall during the latter half of the year 1904 was below normal, and as it was extremely dry the first three months of 1905, the forest was placed in great danger from fires, owing to the great amount of dry material covering the ground.

Forest planting: There has been nothing done in this line in this section during the past year. And as to windbrakes, there is no necessity for them in this section, as the regular trade winds are moderated by the formation of the lands on this island.

Respectfully submitted,

JOHN A. SCOTT.

REPORT OF HON. GEORGE C. HEWITT.

West Kau, Hawaii.

Waiohinu, Kau, Hawaii, Jan. 15, 1906.

Ralph S. Hosmer, Esq.,
Superintendent of Forestry,
Honolulu.

Dear Sir:—In answer to your letter of January 4th, I would say in answer to the various inquiries that I have no knowledge of most of them, as there is very little chance in this district to acquire the information requested. This is the case with the request as to seeding habits of native and introduced trees.

In regard to inquiry No. 2, I would say that in 1889 or 1890 the Hutchinson Sugar Company secured the services of Mr. David Haughs, who remained with them several years as Forester. Mr. Haughs planted many different varieties of trees, having brought a large supply of seeds from Scotland and labored faithfully to secure the results desired. The result was not encouraging owing to various reasons and not many of the trees survived. The Algaroba was extensively planted, but did not seem to grow for the reason perhaps that the elevation was too great. The Ironwood, Monterey Cypress and Japanese Plum were the ones that were the best perhaps—among the many planted—but drought and cattle retarded the growth to a large extent.

There have been no forest fires during 1905 in this section, in fact none for many years.

I have no knowledge of any forest plantations, either for windbrakes or roadside planting.

The Hutchinson Sugar Company has extended a fence from the fence of the Hawaiian Agricultural Company across the lands of Hilea, Ninole, Kaalaiki, Waiohinu and Kiolakaa, along the Kahuku boundary; thence along Kahuku to the lower end of Kiolakaa; thence across to the Waiohinu lands which practically encloses the whole of these lands, the fence being some seventeen miles long. The Kiolakaa lands enclosed are some seven thousand acres of forest. The other lands mentioned contain many thousand acres more. This fencing will keep out the wild cattle. It is already showing good results and will be of great benefit. The ravages of cattle were not as bad at this end of the district as at the eastern end, owing to the fact that there is more rainfall on these uplands and to the numerous swamps, where cattle cannot travel and where the vegetation is very dense so that there is very little grass.

Along the Kona road there is very little change in the forests. In fact below the road the forest seems to be increasing. Many of the various lava flows are being seeded into various shrubs, the seeds of which are carried by birds. But owing to the absence of soil upon these flows this natural planting will not be likely to show many results for years. There seem to be no wild cattle in these forests, so far as I have observed, below the government road. Above the road I have no information, but presume at the higher elevations, they are plentiful. The rainfall is not as heavy and the country is more open than along the Kau forest of Waiohinu, Kaalaiki and Kapapala. As far as I can learn the forests in this district are as a whole increasing.

Yours very truly,

George C. Hewitt.

REPORT OF MR. ERIC H. EDWARDS.

South Kona, Hawaii.

Hoopuloa, Hawaii, April 12, 1906.

Mr. R. S. Hosmer,
Superintendent of Forestry,
Honolulu.

Dear Sir:—As requested I herewith beg to hand you a resume of what has come under my notice, since I took charge of the estate of the late Mr. F. Buchholtz, "Papa Ranch."

The estate is situated at the southern end of South Kona, and runs from the beach up to an elevation of about 5600 feet. The trees were planted by Mr. Buchholtz during the years 1897-1902. Most of them are planted at an elevation running from 1300 to 1700 feet. Though planted on very rocky land they have, however, done remarkably well.

Forest trees of commercial value: Ironwood, Grevillea robusta, Lebanon Cypress, Camphor, Castilloa elastica, and several others whose names I am not able to mention.

Last year, 1904, the Ironwood planted in 1898 bore seed for the first time, and this year, 1905, blossomed in June and seeded some time in December. The trees have also sent out numerous shoots from the roots of the parent tree; some of these shoots are now good sized trees. The largest parent trees have a diameter of about 15 inches, at two feet from the ground, and have attained a height of some 40 feet.

To the best of my knowledge the Grevillea blossomed in July or August last, for the first time, and seeded in November. This tree is evidently well adapted to the rocky soil, and is now, after a seven years' growth, quite a marketable tree. Also, Grevilleas, planted at an elevation of 2450 feet have, in three years, reached a height of from 16 to 20 feet. The other trees mentioned have not blossomed, but have made fair growth, more especially the Lebanon Cypress.

The Camphor trees, planted at 2300 feet elevation, have also made a good growth, but not being protected against stock do not get a fair show. This tree would, I think, make a good windbreak, as it is a quick grower and the foliage is very dense.

Fruit trees of numerous varieties have been planted, but have not had the necessary care for the past year and a half; previous to that, I understand that apple and pear trees bore well. Avocado pear, peach and fig bear well yet; apples lightly.

St. John's Bread, planted at 1700 feet elevation, does well as far as growth is concerned; blossoms in May and June, but does not fruit.

The Lantana fly seems to be rapidly doing away with the Lantana, but I am inclined to think it attacks other trees and plants besides the Lantana. One of the worst pests which does damage to trees and pasture is the grasshopper, which is ever on the increase.

At the latter end of February, 1905, fire broke out in the forest at Opihale, near here, spreading over to Kipahoehoe, and lasting until near the end of March. The area covered by the fire was about 1000 acres, the forest being practically destroyed, and the mould which had been forming for years gone by, has smouldered away, leaving the rocks bare.

Yours truly,
ERIC H. EDWARDS.

REPORT OF MR. W. R. CASTLE.

South Kona, Hawaii.

Honolulu, T. H., March 16, 1906.

Mr. Ralph S. Hosmer,
Superintendent of Forestry,
Honolulu.

Dear Sir:—In answer to your letter requesting a report as to forestry conditions in South Kona, I beg leave to reply as follows:

Planted forests: Unless something has been done in this line which has not been brought to my notice—and a recent visit to Kona having forestry conditions in view has not disclosed such a fact—there has been nothing done in 1905 in planting new forest trees, but there has been a pretty vigorous growth with some trees which were planted before. I refer more particularly to Eucalyptus, which has been planted to some extent, although not with a view to forestry so much as furnishing a shade on some of the lower lands.

Forest nurseries: Do not exist in this district. There has, however, been some collection of Koa seeds from the mountains with the intention of starting such a nursery at the South Kona Agricultural Company's headquarters at Kalahiki.

Native forests: The present condition of this forest seems to be upon the whole good. It has not been possible to visit the upper line of the forest on the mountain during the past year, but from information furnished, I am afraid that the ravages of cattle and goats in destroying the undergrowth has resulted in opening up fields for insect destroyers, which fields are being eagerly cultivated by these pests. I am informed in this particular that more trees on the upper edge of the forest appear to be dying than could be accounted for by age or other conditions.

Forestry in general: I may say that from my recent trip on the island of Hawaii it is my observation that in South Kona the general appearance of the forest is healthy, and there is a spread of the same. A large growth of young Koa is coming up where cattle do not interfere, and on the outside of the woods in common with other parts of the island there seems to be a large increase in the growth of Mamani.

The great fire in the woods of Alika and Kaapuna of February and March, 1905, has been succeeded throughout a large extent of the area burned over by a very vigorous growth of young timber, as well as ferns and grasses. If cattle could be kept away from this region there is no doubt that the burned area would soon be covered by healthy and vigorous growth of young timber.

Respectfully submitted,
W. R. CASTLE.

REPORT OF MR. JOHN A. MAGUIRE.

North Kona, Hawaii.

Huehue, Kailua, Hawaii, Feb. 3, 1906.

Mr. Ralph S. Hosmer,
Superintendent of Forestry,
Honolulu.

Dear Sir:—In reply to yours of January 4th, asking for a report on forestry in my district, I have to state that owing to the unusual drought of 1905 the forests of North Kona suffered a great deal. The inroads made by cattle in their search for moisture and feed have been very great.

The Government cannot afford to make any delay in setting apart and fencing the forest reservation of Honuaula.

The storms of last month coming immediately after the long drought have hastened the denudation of the forests. Gigantic trees were simply mowed down. The underbrush and ferns having been killed by the drought and the cattle, the wind had a clear sweep through the forests.

Trees that withstand drought: The *Grevillea robusta* is the finest tree to withstand drought. It actually glories in it, for it kept in a constant mass of blossoms for nearly a year during the 14 months drought and seeded well. The recent rains have started the seedlings to shoot forth in solid masses. The Grevillea is also a good wind resisting tree.

Trusting that this year will be more favorable, I shall hope to make a better report next year.

Yours very sincerely,
J. A. MAGUIRE,
Forester, North Kona, Hawaii.

No reports were received from the other District Foresters.

LIST OF THE DISTRICT FORESTERS.

Following is a list of the District Foresters, with their respective jurisdictions:

KAUAI.

ALBERT S. WILCOX.

In and for the District of Halelea.

FRANK SCOTT.

In and for the District of Koolau, excepting the land of Anahola.

GEORGE H. FAIRCHILD.

In and for the land of Anahola and the northern portion of the District of Puna, extending as far as the land of Wailua.

F. WEBER.

In and for the southern portion of the District of Puna, from and including the land of Wailua.

REV. J. M. LYDGATE.

In and for the east half of the District of Kona.

FRANCIS GAY.

In and for the District of Waimea.

OAHU.

PAUL R. ISENBERG.

In and for that portion of the District of Kona extending from Makapuu Point to and including Manoa Valley.

WALTER F. DILLINGHAM.

In and for the Districts of Ewa and Waianae.

A. M. NOWELL.

In and for the District of Waialua.

ANDREW ADAMS.

In and for the District of Koolauloa.

L. L. McCANDLESS.

In and for that portion of the District of Koolaupoko extending from Koolauloa to the land of Heeia.

C. BOLTE.

In and for that portion of the District of Koolaupoko extending from and including Heeia to the land of Kailua.

JOHN HERD.

In and for that portion of the District of Koolaupoko extending from and including the land of Kailua to Makapuu Point.

MOLOKAI.

G. C. MUNRO.

In and for the Island of Molokai.

LANAI.

CHARLES GAY.

In and for the Island of Lanai.

MAUI.

L. BARKHAUSEN.

In and for the District of Lahaina.

C. B. WELLS.

In and for the District of Wailuku.

H. A. BALDWIN.

In and for the District of Hamakuapoko and the western half of the District of Hamakualoa.

W. F. POGUE.

In and for the District of Koolau and the eastern half of the District of Hamakualoa.

L. VON TEMPSKY.

In and for the District of Makawao.

L. VON TEMPSKY and DR. J. H. RAYMOND.

In and for the Districts of Kula, Honuaula, and the lands beyond, to and including Kaupo.

H. P. BALDWIN.

District Forester at Large for the Island of Maui.

HAWAII.

T. S. KAY.

In and for the District of North Kohala, and that portion of the District of Hamakua lying between the District of North Kohala and Waimanu Valley.

F. W. CARTER.

In and for the District of South Kohala.

DAVID FORBES.

In and for that portion of the District of Hamakua from and including the Waimanu Valley to the District of Hilo.

JOHN M. ROSS.

In and for that portion of the District of Hilo extending from the District of Hamakua to the land of Makahanaloa.

JOHN A. SCOTT.

In and for that portion of the District of Hilo extending from the District of Puna to and including the land of Kikala.

JOHN WATT.

In and for the District of Puna.

JULIAN MONSARRAT.

In and for that portion of the District of Kau extending from the District of Puna to and including the land of Punaluu.

GEORGE C. HEWITT.

In and for that portion of the District of Kau extending from the land of Punaluu to the District of Kona.

ERIC H. EDWARDS.

In and for that portion of the District of South Kona extending from the District of Kau to the land of Kaohe.

WM. R. CASTLE and GEO. W. McDOUGALL.

In and for that portion of the District of South Kona extending from and including the land of Kaohe to the District of North Kona.

JOHN D. PARIS.

In and for that portion of the District of North Kona extending from the District of South Kona to and including the land of Kahaluu.

JOHN A. MAGUIRE.

In and for that portion of the District of North Kona extending from Kahaluu to the District of South Kohala.

LIST OF DISTRICT FIRE WARDENS.

Following is a list of the District Fire Wardens, with their respective Districts:

CHIEF FIRE WARDEN

RALPH S. HOSMER,

Superintendent of Forestry, *ex officio.*

DEPUTY FIRE WARDEN AT LARGE

DAVID HAUGHS.

In and for the Territory of Hawaii.

DISTRICT FIRE WARDENS.

KAUAI.

FRANK SCOTT.

In and for the District of Koolau, excepting the land of Anahola.

GEORGE H. FAIRCHILD.

In and for the portion of the Districts of Koolau and Puna, extending from the land of Anahola to the land of Olohena, inclusive.

F. WEBER.

In and for the portion of the District of Puna, south of and including the land of Wailua.

REV. J. M. LYDGATE.

In and for that portion of the District of Kona, formerly known as the District of Koloa.

FRANCIS GAY.

In and for that portion of the District of Kona, formerly known as the District of Waimea.

OAHU.

ANDREW ADAMS.

In and for the District of Koolauloa.

FRANK PAHIA.

In and for that portion of the District of Koolaupoko, extending from the Koolauloa District line to the land of Heeia.

C. BOLTE.

In and for that portion of the District of Koolaupoko, extending from and including Heeia to the land of Kailua.

JOHN HERD.

In and for that portion of the District of Koolaupoko, extending from and including the land of Kailua to Makapuu Point.

W. M. GIFFARD.

In and for that portion of the District of Kona, lying between Pauoa and Manoa Valleys.

H. J. RHODES.

In and for Palolo Valley, District of Kona.

F. MEYER.

In and for that portion of the District of Waianae lying to the West of the Waianae Mountains.

WALTER F. DILLINGHAM.

In and for the District of Ewa and that portion of the District of Waianae lying to the East of the Waianae Mountains.

A. M. NOWELL.

In and for the District of Waialua.

BYRON O. CLARK.

For that portion of the Lands of Wahiawa and Waianae-uka, lying to the East of the main Government road from Ewa to Waialua.

MOLOKAI.

G. C. MUNRO.

In and for the Island of Molokai, excepting that portion between the lands of Pukoo and Halawa, inclusive.

C. C. CONRADT.

In and for that portion of the east end of the Island of Molokai, between the lands of Pukoo and Halawa, inclusive.

LANAI.

CHARLES GAY.

In and for the Island of Lanai.

MAUI.

LOUIS BARKHAUSEN.

In and for the District of Lahaina.

C. B. WELLS.

In and for the District of Wailuku.

R. C. SEARLE.

In and for the District of Kaanapali.

H. P. BALDWIN.

Fire Warden at Large, for the Island of Maui.

L. VON TEMPSKY.

In and for the Districts of Kula and Kaupo.

J. H. RAYMOND, M. D.

In and for the Districts of Honuaula and Kahikinui.

H. A. BALDWIN.

For the District of Hamakuapoko and the west half of the District of Hamakualoa.

W. F. POGUE.

In and for the District of Koolau and the east half of the District of Hamakualoa.

JOHN CHALMERS.

In and for the District of Hana.

HUGO HANEBERG.

In and for the District of Kipahulu.

HAWAII.

T. S. KAY.

In and for the north half of the District of Kohala.

F. W. CARTER.

In and for the south half of the District of Kohala.

D. FORBES.

In and for the western part of the District of Hamakua, extending to the boundary of the land of Paauhau.

JAMES GIBB.

For that portion of the District of Hamakua, extending from the western boundary of the land of Paauhau to the boundary of the land of Kukaiau.

ALBERT HORNER.

In and for that portion of the District of Hamakua, extending from and including the land of Kukaiau to the Hilo District Line.

JOHN M. ROSS.

In and for that portion of the District of Hilo, extending from the land of Makahanaloa to the Hamakua District Line.

JOHN A. SCOTT.

In and for that portion of the District of Hilo, extending from the Puna District Line to and including the land of Kikala.

JOHN WATT.

In and for the District of Puna.

JULIAN MONSARRAT.

In and for that portion of the District of Kau, extending from the Puna District Line to and including the land of Punaluu.

CARL WOLTERS.

In and for that portion of the District of Kau, extending from the land of Punaluu to the Kona District Line.

ERIC H. EDWARDS.

In and for that portion of the District of Kona, extending from the Kau District Line to and including the land of Kaapuna.

GEORGE W. McDOUGALL.

In and for the portion of the District of Kona, extending from the land of Kaapuna to and including the land of Hookena.

JOHN D. PARIS.

In and for that portion of the District of Kona, extending from the land of Hookena to and including the land of Kaawaloa.

T. C. WHITE.

In and for that portion of the District of Kona, extending from the land of Kaawaloa to the land of Kahaluu.

JOHN A. MAGUIRE.

In and for that portion of the District of Kona, extending from the land of Kahaluu to the Kohala District Line.

WARNING NOTICE

FOREST FIRE

RULES and LAWS

All persons are warned not to set fires on Government Forest Land.

Fires for clearing land near a forest must not be started during dry times without permission of the District Fire Warden.

Fires for burning brush near a forest must be watched by competent persons until the fire is completely extinguished.

Fires for smoking out bees are prohibited on Government Forest Land.

Hunters and smokers are cautioned against allowing fires to start from cigars, pipes and cigarettes.

Especial care should be taken that lighted matches are extinguished before they are thrown down.

All persons are requested to report immediately any cases which come to their knowledge of injury to wood-land arising from a violation of these rules.

LAWS OF THE TERRITORY OF HAWAII

ACT 71 OF THE SESSION LAWS OF 1905

SEC. 1. FOREST FIRE SERVICE. It shall be the duty of the Board of Commissioners of Agriculture and Forestry to take measure for the prevention, control and extinguishment of forest fires within the Territory.

SEC. 5. SETTING FIRES. Every person who wilfully, maliciously or negligently sets on fire or procures to be set on fire any woods, brush, prairies, grass, grain or stubble on any lands not owned, leased or controlled by him whereby any property of another is injured or destroyed, and every person who accidently sets or causes to be set any fire on land not owned, leased or controlled by him, which spreads to the land of another, and allows said fire to escape from his control, without using every effort to extinguish it, shall be deemed guilty of a misdemeanor and liable to a fine of not less than twenty-five dollars nor more than five thousand dollars. Setting such fires or causing or procuring them to be set or allowing them to escape shall be prima facie proof of wilfulness, malice or negligence under this section; provided that nothing herein contained shall apply to a person who, in good faith, sets a back fire to check a fire already burhing.

SEC. 6. FIRES TO CLEAR LAND. In times and localities of particular fire danger, the Chief Fire Warden may cause a warning to be issued that during a specified time fires to clear land, including the burning of fallows, stumps, logs, brush, dry grass, or fallen timber, shall not be started, unless the written permission of the District Fire Warden of the District in which the fire is set has been first obtained. Such fires shall not be started during a heavy wind or without sufficient help present to control the same, and the fire shall be watched by the person setting the same, or by competent agents of his, until put out.

By Order of the Board of Commissioners of Agriculture and Forestry.

RALPH S. HOSMER,
Superintendent of Forestry and Chief Fire Warden.

Forest Fire Law.

ACT 71, SESSION LAWS OF 1905.

AN ACT.

TO PROVIDE FOR THE PROTECTION OF FOREST LAND WITHIN THE TERRITORY FROM FIRE.

Be it Enacted by the Legislature of the Territory of Hawaii:

FOREST FIRE SERVICE.

Section 1. It shall be the duty of the Board of Commissioners of Agriculture and Forestry to take measure for the prevention, control and extinguishment of forest fires within the Territory.

CHIEF FIRE WARDEN.

Section 2. The Superintendent of Forestry shall be ex-officio Chief Fire Warden. The Chief Fire Warden shall have charge of all the Fire Wardens of the Territory, and shall aid and direct them in their duties.

DISTRICT FIRE WARDENS.

Section 3. The Board of Commissioners of Agriculture and Forestry shall appoint in such number and localities as it deems wise, persons to act as District Fire Wardens. They shall promptly report to the Chief Fire Warden all fires in their respective district and take immediate and active steps toward their extinguishment, assist in apprehending offenders against this Act, and give all possible assistance to the Chief Fire Warden. For all services in extinguishing fires and in apprehending offenders, payment shall be made by the Territory, at the rate of twenty-five cents per hour for the time actually employed, provided that the payment for such services shall not in any case exceed one hundred Dollars to any one person for any one year.

POWERS OF FIRE WARDENS AND ASSISTANCE OF PERSONS IN FIGHTING FIRE.

Section 4. All Fire Wardens shall have authority to employ all able bodied male persons, between the ages of 16 and 50 years, in the district in which they act, for assistance in putting out fire.

Compensation for services in fighting fire shall be at such rate for the time actually employed as the District Fire Warden shall fix.

The Fire Warden in charge, shall submit time record and bill of the men employed, to the Chief Fire Warden, who shall examine and, if he approves it, shall forward the bill at once to the Auditor.

The District Fire Wardens shall have power to incur expenses for the transportation and other unavoidable expenses of fire fighters, and shall include the same, with necessary vouchers, in their accounts.

SETTING FIRES.

Section 5. Every person who wilfully, maliciously or negligently sets on fire or causes or procures to be set on fire any woods, brush, prairies, grass, grain or stubble on any lands not owned, leased or controlled by him; and every person who wilfully, maliciously or negligently allows a fire to escape from land owned, leased or controlled by him whereby any property of another is injured or destroyed; and every person who accidentally sets or causes to be set any fire on land not owned, leased or controlled by him, or sets or causes to be set any fire on land owned, leased or controlled by him, which spreads to the land of another, and allows said fire to escape from his control without using every effort to extinguish it, shall be deemed guilty of a misdemeanor and liable to a fine of not less than twenty-five dollars nor more than five thousand dollars. Setting such fires or causing or procuring them to be set or allowing them to escape shall be prima facie proof of willfulness, malice or negligence under this section, provided that nothing herein contained shall apply to a person who, in good faith, sets a back fire to check a fire already burning.

FIRES TO CLEAR LANDS.

Section 6. In times and localities of particular fire danger, the Chief Fire Warden may cause a warning to be issued that during a specified time fires to clear land, including the burning of fallows, stumps, logs, brush, dry grass or fallen timber, shall not be started, unless the written permission of the District Fire Warden of the District in which the fire is set has been first obtained. Such fires shall not be started during a heavy wind or without sufficient help present to control the same, and the fire shall be watched by the person setting the same, or by competent agents of his, until put out.

Section 7. This Act shall take effect from and after the date of its approval.

Approved the 26th day of April, A. D., 1905.

G. R. CARTER,
Governor of the Territory of Hawaii.

Report of the Librarian.

Honolulu, T. H., Dec. 31, 1905.

Board of Commissioners of
Agriculture and Forestry,
Honolulu, Oahu.

Gentlemen:—At a meeting of the Board held on March 9th, 1904, it was resolved that "until further notice Mr. Ralph S. Hosmer be authorized and requested to take charge of the general offices, library, correspondence, records, and employees of the Board, with the exception of the members of the Entomological Division., subject to the control of the Board." As an outcome of the above action I have the honor to submit the following report covering the condition of the Board library, the office and other routine work of the Board, and the care and condition of the buildings and grounds during the past year.

LIBRARY.

The Library of the Board of Agriculture and Forestry is now officially regarded as the Department of Natural Science of the Library of the Territory, and as such there are turned over to it the publications properly coming under this general head, received by other departments of the Government.

The aim of the Library is to cover the field of Agriculture in its large sense, especial attention being paid to the branches of Botany, Entomology, Forestry and Animal Industry, particularly in relation to subtropical conditions.

The Library is maintained as a free reference library, open to the public, daily, during office hours. It receives accessions through gift, purchase and exchange, and now contains somewhat over 4,000 books and pamphlets, not including the current publications regularly received.

The Library receives regularly all the publications of the several Bureaus and Divisions of the U. S. Department of Agriculture, of each of the State Experiment Stations in the Union, as well as those in Cuba and Porto Rico, and the Bureau of Science in the Philippines. It is on the exchange list of the Departments of Agriculture in most of the British Colonies, in Australasia, the East and West Indies, and South Africa, as well as on those of several other foreign countries. Other publications regularly received are the reports and bulletins of the Smithsonian Institution and the U. S. National Museum, certain Divisions of the U. S. Geological Survey, the U. S. Department of Labor and Commerce, the Carnegie Institution of Washington, and the Field Columbian Museum of Chicago.

Current periodicals covering various phases of agriculture, especially those dealing with subtropical conditions, are received through exchange or subscription, together with a limited number of technical journals on special subjects. The names of fifty-three of the more important magazines now on file in the Library are given in the following:

List of Periodicals Regularly Received by the Library of the Board of Agriculture and Forestry.

Official Journals.

Agricultural Journal, Cape Town, South Africa.
Agricultural News, Barbadoes, West Indies.
Agricultural Gazette, Hobart, Tasmania.
Journal of Agriculture, Melbourne, Victoria.
Agricultural Gazette, Sydney, New South Wales.
Journal, Department of Agriculture, Perth, Western Australia.
West Indian Bulletin, Barbadoes, West Indies.
Journal, Jamaica Agricultural Society, Kingston, Jamaica.
Victoria Naturalist, Melbourne, Victoria.
Queensland Agricultural Journal, Brisbane, Queensland.
Boletim da Agricultura, Sao Paulo, Brazil.
Journal of Science, Manila, P. I.
Bulletin, College of Agriculture, Tokyo, Japan.
Crop Reporter, Washington, D. C.
Experiment Station Record, Washington, D. C.
U. S. Consular and Trade Reports, Washintgon, D. C.
Congressional Record, Washington, D. C.

Journals of Tropical Agriculture.

The Tropical Planter, Rochester, New York.
Tropical Agriculturist, Colombo, Ceylon.
Indian Planting and Gardening, Calcutta, India.
L' Agriculture Practique des Pays Chauds, Paris, France.
Journal D'Agriculture Tropicale, Paris, France.
Der Tropenpflanzer, Berlin, Germany.

General Agriculture and Special Industries.

The American Farmer, New York.
American Agriculturist, New York.
Rural New Yorker, New York.
Up to Date Farming, Indianapolis, Indiana.
Farm Journal, Philadelphia, Penn.
Gleanings in Bee Culture, Medina. Ohio.
India Rubber World, New York.
Tea and Coffee Trade Journal, New York.

Fruit Trade Journals.

California Cultivator, Los Angeles, California.
California Fruit Grower, San Francisco, California.
Pacific Fruit World, Los Angeles, California.
Rural Californian, Los Angeles, California.
Pacific Rural Press, San Francisco, California.

Forestry Magazines.

Forestry Quarterly, Ithaca, New York.
Forestry and Irrigation, Washington, D. C.
Arboriculture, Connerville, Indiana.
The Indian Forester, Allahabad, India.
Rod and Gun in Canada, Woodstock, Ontario.

Entomological Magazines.

Entomological News, New York.
The Entomologist, London.
Entomologist's Monthly Magazine, London.

Canadian Entomologist, Canada.
The Insect World, Japan.

General Science.

Science, New York.
Nature, London.
Popular Science Monthly, New York.

Local Magazines.

Hawaiian Forester and Agriculturist, Honolulu.
Hawaiian Planters' Monthly, Honolulu.
Paradise of the Pacific, Honolulu.
The Friend, Honolulu.

New Books.

The purchase of books has necessarily had to go slowly, but gradually the standard works on Botany, Entomology and Forestry are appearing on our shelves. Among the more important accessions received in this way during the last year may be mentioned the following:

Forestry Books.

Sargent's "Manual of the Trees of North America" and "Forest Flora of Japan"; Floras of the Northern United States and Canada, the Southern States, Mexico, New Zealand, Queensland, Fiji Islands and Guam, Snow's "Principal Species of Woods," Fernow's "Economics of Forestry," Bruncken's "North American Forests and Forestry," Newell's "Irrigation in the United States," Wilson's "Irrigation Engineering," Webber's "The Forests of Upper India," Merrill's "Rocks, Rock Weathering and Soils," Marsh's "The Earth as Modified by Human Action."

Entomological Books.

Ratzeburg's "Forst Insecten," Say's "Entomology," Zoological Record for 1904, "Insect Life (complete with index), Aldrich's "Catalogue North American Diptera," Sorauer's

"Handbuch der Pflanzenkranheiten," Signoret's "Cochenilles," Peckham's "Wasps, Social and Solitary," Kellogg's "American Insects," Wright's "The Butterflies of the West Coast," "Hours with Insects," Saunders' "Fruit Insects," Balfour's "The Agricultural Pests of India," Donavan and Westwood's "Insects of China," Donavan and Westwood's "Insects of India," Weise's "Exotic Coccinellidae."

The attention of the public has been repeatedly called to to the Library and to the opportunity for study it affords to persons interested in tropical agriculture, and gradually it is coming to be consulted. Visitors are always welcome and the members of the Board staff are glad to assist them in every way in making use of the books in the Library.

The Entomological publications are kept in cases in the rooms of that Division, facilitating the work of that staff and also increasing the shelf space in the general Library room. Arrangements have already been made for the addition of new cases in the Library room which will be appreciated as the present shelves are beginning to be crowded.

A card catalog of the Library by subject, author and series, has been started, the Entomological books being first taken up. In this connection mention may be made of the official card catalog of the Experiment Station publications, prepared by the U. S. Department of Agriculture and covering the publications of all the Experiment Stations in the United States. It now numbers over 26,000 cards, each containing a brief abstract of a bulletin or report. The cards are now being classified in a special case. When arranged the catalog will be a great help in ready reference, especially as many of the publications referred to may be found in the Library.

ROUTINE WORK.

The routine office work of the Board has been carried on during the past year by Miss Melika Peterson and Miss Ella K. Dayton, who took Miss Peterson's place during the latter's absence, because of illness, from April 5th to October 18th, 1905. Both have given faithful and conscientious service and done much to assist the members of the staff in the work of the Board.

During the year somewhat over 100 "Board" letters have been sent out, in addition to those of the several Divisions. Of these the "Forestry" letters number about 600.

The Clerk of the Board attends to the stenographic work of the Division of Forestry and of the Veterinarian, beside typewriting various reports and other special papers. many of which are made with a number of carbon copies that they may be sent to members of different Committees. The Clerk also reports the Board meetings, keeps the books of the office—in itself no little work, as the appropriation is segregated into numerous items—and attends to other routine work.

During the year the mailing list has been reclassified and enlarged and the names typed on cards. In response to requests, the first annual report and other publications of the Board have been freely distributed, while through this office there have also been sent out the Hawaii quota of the 1903 and 1904 Yearbooks of the U. S. Department of Agriculture, received through the courtesy of the Delegate to Congress.

Office Equipment.

The office equipment has been bettered during the year by the addition of new units in the filing cases and by the introduction of call bells, a telephone extension, added electric lights for night meetings, etc.

Several changes have been made in the Board building. The room on the Ewa side of the hall, between the Exhibit room and the Entomologist's office, has been fitted up as the office of the Territorial Veterinarian, while certain modifications in the Entomological laboratory have added to the convenience of the staff of the Division and to the efficiency of its work. The building has been screened throughout and equipped with ventilators in each room, while on the outside a flag pole was erected in December, from which the flag is now regularly displayed during office hours.

The Exhibit of Woods and Fruits was opened to the public early in the year and has received favorable comment from many visitors. During the year many new fruits have been added to the collection, the work of properly preparing them for exhibition being done under the direction of Mr. Alexander Craw. A record book has recently been installed in which visitors are requested to register. During November and December, the names of 46 persons were entered in this volume, but as many visitors neglect to sign, this only represents a part of those who have visited the building.

The Board room was used during 1905 for ten Board meetings; also for evening meetings by the following organizations: Entomological Society, ten times; Farmers' Institute, twice; Honolulu Improvement Committee, once. The electric lights that have recently been put in contribute much to the comfort of evening meetings and make the building a good place for such gatherings. Through these meetings the Board gets the advantage of acquainting the public with its library and work and in bringing them in touch with what the different members of the staff are doing.

The appearance of the Nursery grounds has been much improved during the year and they are now kept in good shape with the help of two prisoners, detailed by Sheriff Henry for that purpose. As was noted in my report as Superintendent of Forestry, the trees in the Nursery grounds were labelled early in the year with neat signs giving the common and scientific name of each. A new entrance driveway on the Waikiki side of the building, begun in December, will add to the convenience of the staff. A liberal use of green stain has rendered the fences, stables and laborers' quarters inconspicuous and attractive. With the completion of certain other improvements to be made in January the buildings and grounds will be put in a condition of much greater usefulness than at any time in the past.

Very respectfully,

RALPH S. HOSMER,
Librarian.

Issued February 28; 1907

TERRITORY OF HAWAII
BOARD OF AGRICULTURE AND FORESTRY

DIVISION OF FORESTRY
RALPH S. HOSMER, Superintendent

REPORT
OF THE
DIVISION OF FORESTRY
FOR THE YEAR ENDING DECEMBER 31, 1906

REPRINT FROM THE THIRD REPORT OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY

HONOLULU:
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DIVISION OF FORESTRY.

Report of the Superintendent of Forestry.

Honolulu, Dec. 31, 1906.

Board of Commissioners of
Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:—I have the honor to submit the following report covering the work of the Division of Forestry during the calendar year 1906; and to transmit in addition certain reports from my assistant, the Forest Nurseryman, and from a majority of the District Foresters, dealing in detail with various aspects of forestry in the Territory.

The past year has been one of construction in the forest work of Hawaii. While marked by no spectacular accomplishments—forest work seldom is—it has seen much done toward strengthening the foundations upon which forestry in the islands rests; work which cannot but result in benefit to the Territory in the years that are to come.

The general program of forest work adopted when the Division of Forestry was organized three years ago has been followed during 1906. The creation of forest reserves has continued to hold first place in the activities of the Division and has claimed the major part of my own time and attention, as it must in future until the projected system of forest reserves is actually established.

Next in importance has come the work of the Section of Forest Extension. The notable feature here is the increasing number of requests that have been received for advice and assistance from persons or corporations desiring to establish forest plantations. It has been clearly demonstrated that the offer of cooperative assistance published in December, 1905, meets a real demand; one that will become more and more pressing as the natural supply of wood diminishes. This branch of the Division's work has been under the direct charge of Mr. David Haughs, Forest Nurseryman, who from his intimate acquaintance with island conditions is well fitted to handle it. The policy of helping the individual to help himself will, it is believed, result in much permanent good to the Territory. Certainly the expenditure so made goes much further than would a very much larger sum devoted to actual tree planting by the Territory itself. This work will therefore be continued during the coming year.

Other branches of forest work have received as much attention as the very limited staff could give them. The results achieved are set forth in the following pages under the several main headings under which the work of the Division of Forestry may naturally be divided.

APPROPRIATION.

The appropriation for salaries on the statutory roll of the Division of Forestry for the present fiscal period (July 1, 1905 to June 30, 1907) was $10,000.00, or $5,000.00 per annum. Of the total lump sum appropriated for the Current Expenses of the Board ($29,848.00), the amount allotted to the Division of Forestry was $5,450.00 per annum. During the past year, owing to a re-allotment made necessary by the needs of the Division of Animal Industry, the Forestry fund was somewhat curtailed, thereby reducing the amount available for forestry items. The necessity for this cut is to be regretted but that it was unavoidable and essential to the work of the Board as a whole is not questioned.

STAFF.

The regular staff of the Division of Forestry during 1906 has consisted of the Superintendent of Forestry and the Forest Nurseryman.

For a period of two months during the summer Mr. Charles S. Judd was appointed temporarily, as Special Forest Agent, to carry on certain investigations on Kauai. These are discussed on another page of this report.

One forest ranger, Mr. David Kapihe was appointed in March for patrol duty in the Tantalus Heights District, to see that the regulations of the Board in regard to forest fire and trespass were carried out. He continues to serve.

Several additional District Foresters and District Fire Wardens have been appointed during the year and some other changes have been made in the personnel of these corps. Revised lists are given elsewhere in this report.

As in former years, the stenographic and clerical work of the Division of Forestry has been performed by the general clerk and stenographer of the Board, Miss Melika Peterson.

Mention may be made here of my absence from the Territory from April 7 to July 13. Two months of this period was a leave of absence; the remainder was a furlough without pay. In the course of my vacation I visited the eastern states, spending some time in Washington, D. C., and in Boston. During my absence Mr. Haughs was Acting Superintendent of Forestry and Acting Chief Fire Warden.

FOREST RESERVES.

The objects for which the Hawaiian forest reserves are made have been so often set forth that it seems almost unnecessary to repeat the statement here. But lest this report fall into the hands of persons not familiar with the local conditions it may be said that the native Hawaiian forests are chiefly of value as conservators of water, and that the forest reserves are created on the important watersheds of the Terriory that the forest within their boundaries may be permanently maintained as a protective cover. On the drainage from the area that the forest reserves do or will include depends the supply of the various irrigation and power-development systems that have been or may be built on each of the large islands. In Hawaii, as on the mainland, forestry and irrigation are closely related; only by the perpetuation of the forest cover can the streams be maintained and their flow kept relatively constant.

The Hawaiian forest reserves are created by the Governor of the Territory, who acting on the recommendations of the Board of Agriculture and Forestry, declares by proclamation that within certain specified boundaries the land should be permanently maintained under a forest cover. This declaration constitutes the area a forest reserve. The Governor then sets apart such unleased government lands as may be within the reserve boundaries, and from time to time, as the leases on other government lands in the reserve expire, adds them as well to the area actually set apart. In most of the reserves there is also privately owned land, but that this may be treated as an organic part of the reserve, the law provides that the management and control may be turned over to the Board of Agriculture and Forestry. Such action has already been taken in one reserve. The law creating the present Board of Commissioners of Agriculture and Forestry, and providing for the establishment of forest reserves, is Chapter 28 of the Revised Laws of Hawaii.

RESERVES ESTABLISHED.

During the year seven new forest reserves have been created. They have an aggregate area of 126,825 acres and are distributed throughout the Territory as follows: Kauai, one; Oahu, three; Maui, one; Hawaii, two. Of the total area, 62,425 acres have been actually set apart.

The total number of forest reserves is now twelve. These have a combined total area of 337,147 acres within the reserve boundaries. Of this 117,532 acres of unleased government land have been actually set apart.

The following table gives the essential facts about the twelve established forest reserves, arranged in the order of the creation of the reserves. The several slight differences in area between this and similar tables heretofore published are due to corrected computations of area, recently made by the Survey Office.

TABLE I.

FOREST RESERVES—TERRITORY OF HAWAII.

ARRANGED IN CHRONOLOGICAL ORDER.

No.	Name	District	Island	Total Area Recommended to be Reserved	Area Government Land Actually Reserved	Date of Proclamation	Proclamations Signed by
				Acres	Acres		
1	Kaipapau ..	Koolauloa	Oahu...	913	913	Nov. 10, 1904	G. R. Carter
2	Hamakua Pali	Hamakua.	Hawaii..	18,940	16,133	Dec. 23, 1904	" "
	Total for 1904..............			19,853	17,046		
3	Hilo........	Hilo..........	Hawaii..	110,000	12,771	July 24, 1905	A. L. C. Atkinson
4	Koolau, Maui	Koolau, Hamakua-loa.	Maui....	42,969	14,300	Aug. 24, 1905	" " "
5	Halelea.....	Halelea	Kauai. .	37,500	10,990	Aug. 24, 1905	" " "
	Total for 1905..............			190,469	38,061		
6	Kealia......	Puna..........	Kauai. .	9,935	7,385	Mar. 9, 1906	" " "
7	Ewa..	Ewa, Waianae and Waialua	Oahu...	28,550	4,768	Mar. 9, 1906	" " "

TABLE I—Continued.

No.	Name	District	Island	Total Area Recommended to be Reserved	Area Government Land Actually Reserved	Date of Proclamation	Proclamations Signed by
				Acres	Acres		
8	Honuaula ..	Kona	Hawaii .	665	665	Apr. 4, 1906	A. L. C. Atkinson
9	Kau	Kau	" .	65,850	35,960	Aug. 2, 1906	G. R. Carter
10	Waianae-kai.	Waianae	Oahu ..	3,257	3,150	Sept. 7, 1906	" "
11	Lualualei ...	"	" ..	3,743	3,743	Nov. 30, 1906	" "
12	Hana	Hana	Maui ..	14,825	6,754	Nov. 30, 1906	" "
	Total for 1906			126,825	62,425		
	Grand total			337,147	117,532		

Table II shows the same data for the existing reserves, arranged by islands and counties.

TABLE II.

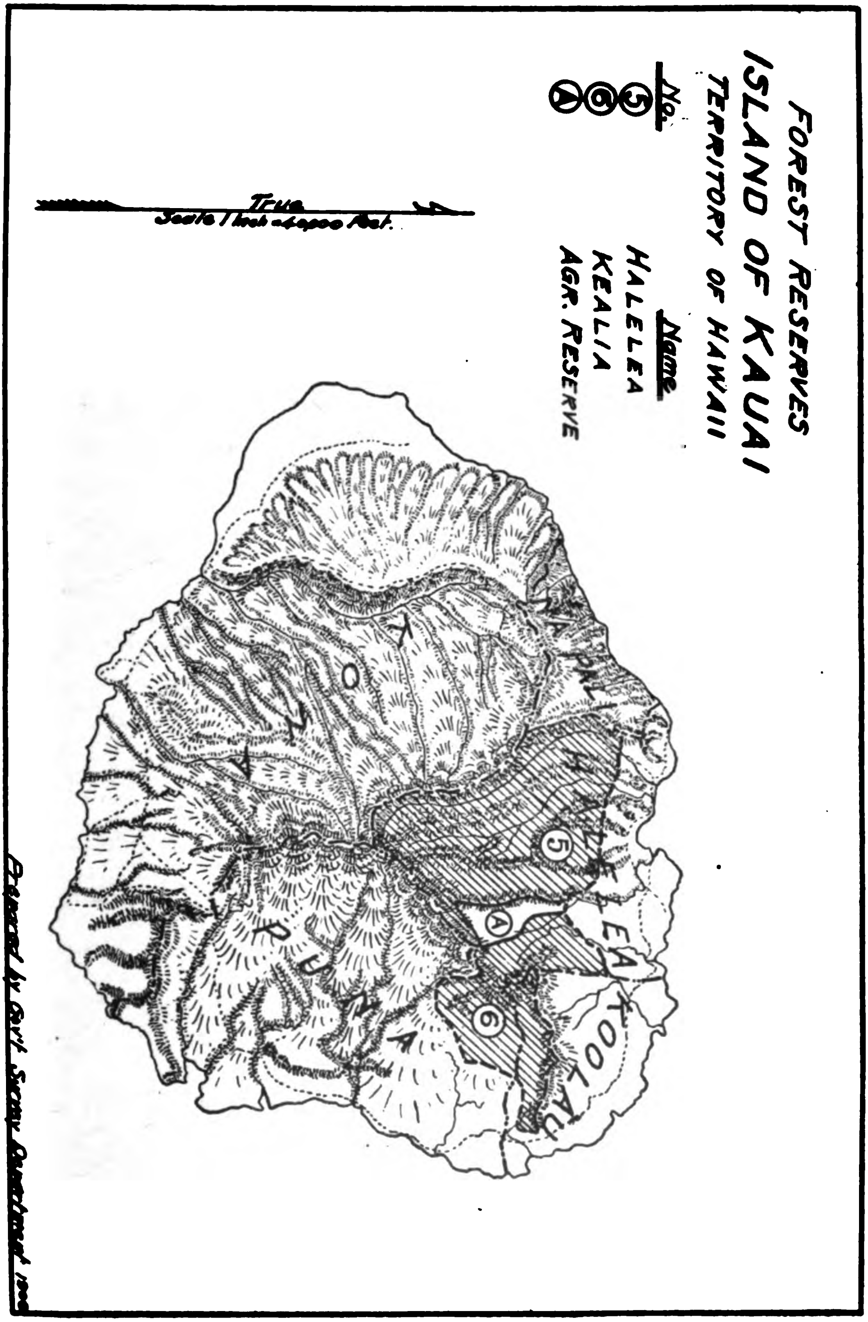
FOREST RESERVES—TERRITORY OF HAWAII.

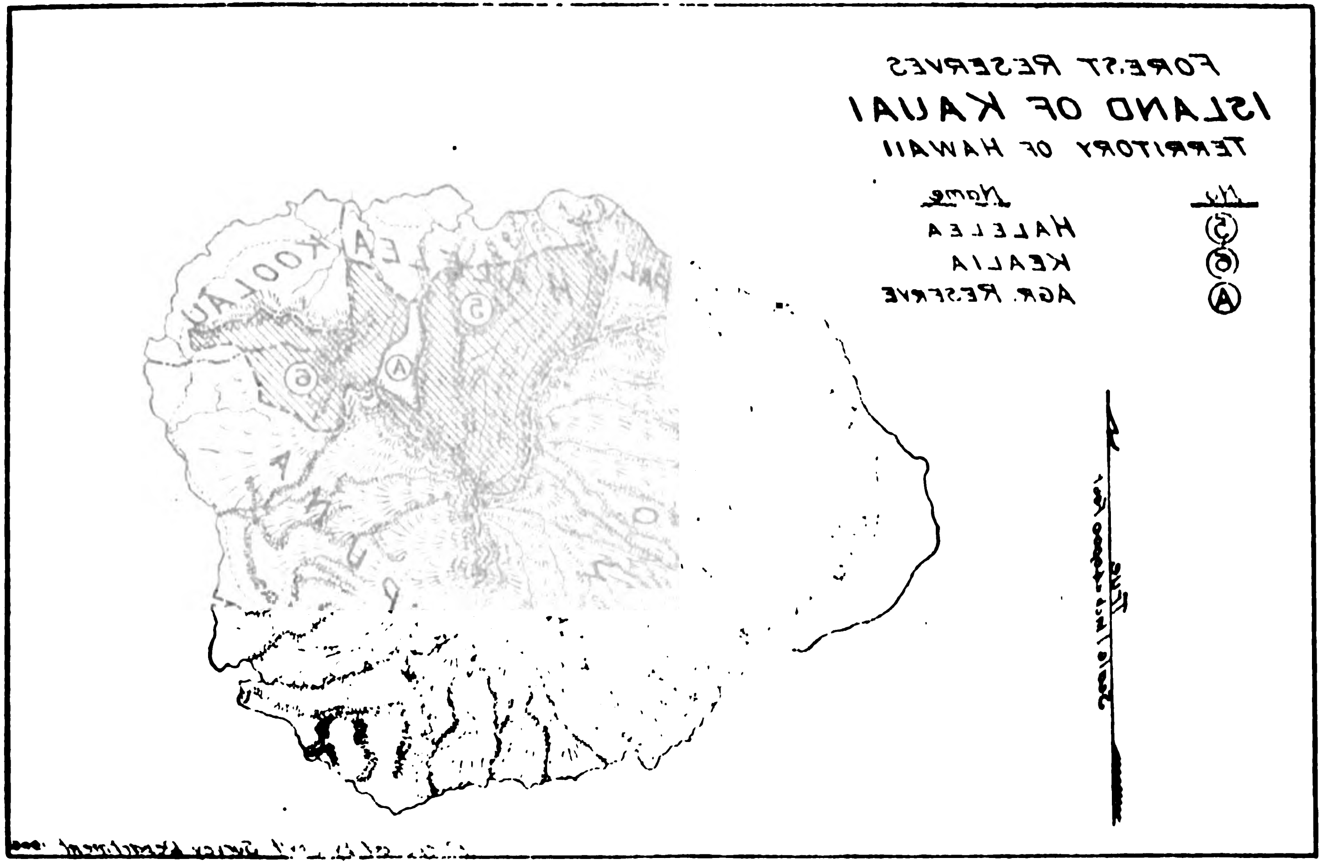
ARRANGED BY COUNTIES.

No.	Name	District	Island	Total Area Recommended to be Reserved	Area Government Land Actually Reserved	Date of Proclamation	Proclamations Signed by
			COUNTY OF KAUAI.				
				Acres	Acres		
5	Halelea	Halelea	Kauai	37,500	10,990	Aug. 24, 1905	A. L. C. Atkinson
6	Kealia	Puna	"	9,935	7,385	Mar. 9, 1906	" " "
			Total,	47,435	18,375		
			COUNTY OF OAHU.				
1	Kaipapau	Koolauloa	Oahu	913	913	Nov. 10, 1904	G. R. Carter
7	Ewa	Ewa, Waianae and Waialua	"	28,550	4,768	Mar. 9, 1906	A. L. C. Atkinson
10	Waianae-kai	Waianae	"	3,257	3,150	Sept. 7, 1906	G. R. Carter
11	Lualualei	"	"	3,743	3,743	Nov. 30, 1906	" "
			Total,	36,463	12,574		

TABLE II—Continued.

No.	Name	District	Island	Total Area Recommended to be Reserved	Area Government Land Actually Reserved	Date of Proclamation	Proclamations Signed by
			COUNTY OF MAUI.				
				Acres	Acres		
4	Koolau, Maui .	Koolau, Hamakua-loa. . . .	Maui . . .	42,969	14,300	Aug. 24, 1905	A. L. C. Atkinson
12	Hana	Hana	" . . .	14,825	6,754	Nov. 30, 1906	G. R. Carter
			Total,	57,794	21,054		
			COUNTY OF HAWAII.				
2	Hamakua Pali	Hamakua	Hawaii. .	18,940	16,133	Dec. 23, 1904	G. R. Carter
3	Hilo	Hilo	" . .	110,000	12,771	July 24, 1905	A. L. C. Atkinson
8	Honuaula	Kona	" . .	665	665	Apr. 4, 1906	" " "
9	Kau	Kau	" . .	65,850	35,960	Aug. 2, 1906	G. R. Carter
			Total,	195,455	65,529		
	Grand Total, ...			337,147	117,532		


FOREST RESERVES
ISLAND OF KAUAI
TERRITORY OF HAWAII
No. Name
⑤ HALELEA
⑥ KEALIA
Ⓐ AGR. RESERVE
True
Scale 1 Inch = 42000 Feet.
NA PALI
KONA
PUNA
HALELEA
KOOLAU
5
A
6
Prepared by Gov't Survey Department 1905


FOREST RESERVES
ISLAND OF KAUAI
TERRITORY OF HAWAII
No. Name
5 HALELEA
6 KEALIA
A AGR. RESERVE
True
Scale 1 inch = 4 9000 feet
KOOLAU
HALELEA
PUNA
5
6
A

ERRATUM.

For "Kealea" read "Kealia," lines 2 and 5, page 23.

The seven reserves made in 1906 may be thus briefly described:

Kealea Forest Reserve, Kauai.

This reserve includes the mauka portion of the three large government lands of Anahola, Kamalomalo and Kapaa, and the private land of Kealea, at the north end of the PunaDistrict, Island of Kauai. The total area is 9,935 acres. That of the government land actually set apart is 7,385 acres, or 74 per cent. Its value as a watershed justifies the creation of this reserve.

Ewa Forest Reserve, Oahu.

The section covered by this reserve is one of the most important watersheds in the Territory, in that it supplies the major part of the water for the three great sugar plantations, Ewa, Oahu and Honolulu, whose combined output made in 1906 over one-sixth of the total sugar crop of the Territory. The total area of this reserve is 28,550 acres. Much of it is private land, but of the 5,151 acres belonging to the Territory 4,768 have been set apart. This is 1.7 per cent of the whole reserve and 93 per cent of the government land.

Honuaula Forest Reserve, Hawaii.

The Honuaula Forest Reserve is a tract of 665 acres on the western slope of Mt. Hualalai in the District of Kona on Hawaii. It is part of a government land now under lease for grazing but by an arrangement effected through the Land Office this area was surrendered and set apart as a reserve. It contains some of the best Koa (*Acacia Koa*) forest on any government land on Hawaii.

Kau Forest Reserve, Hawaii.

The Kau Forest Reserve is another very important reserve because from it comes the water that serves the two large sugar plantations in Kau to flume their cane and irrigate their lower lands. The reserve lies on the lower slopes of Mauna Loa. It is the second in size of the reserves so far declared. The total area is 65,850 acres. Of this 55 per cent., or 35,960 acres of government land have been actually set apart.

Waianae-kai and Lualualei, Oahu.

These two reserves are situated on the western slope of the Waianae mountains on Oahu and in reality form one tract. They include both the scanty forest on the upper slopes and the barren ridges lower down that should be brought back under a forest cover. With lands on the leeward side of the islands it is essential that all the water possible be made available for use. A forest on the slopes will help to secure this result; hence the reserve. The area of Lualualei is 3,743 acres, all reserved; that of Waianae-kai 3,257 acres, of which all but 107 acres (3 per cent.) is government land, actually set apart.

Hana Forest Reserve, Maui.

The Hana Reserve includes the entire mauka portion of the Hana District. It covers an area of 14,825 acres, the greater part of which is government land. There are actually set apart 6,754 acres, or 46 per cent. This reserve is also important as a protective forest, especially in connection with the Koolau Forest Reserve, which it adjoins.

DETAILED REPORTS.

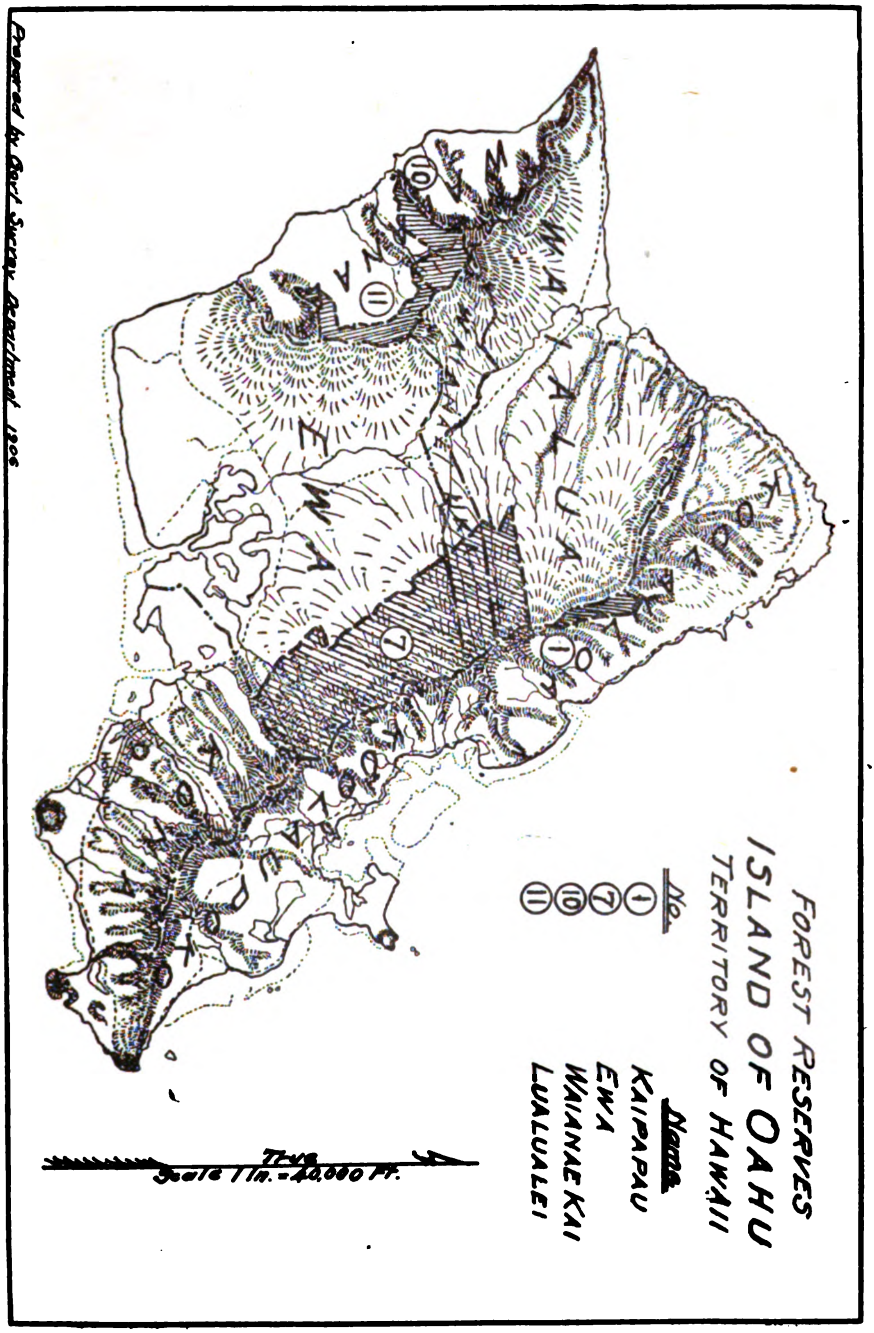
Following the established usage of the Board the reports, resolutions, descriptions of boundaries and proclamations dealing with the several reserves have been published in the Hawaiian Forester and Agriculturist as each reserve has been made. The original reports are filed in the office of the Board of Agriculture and Forestry, with official copies of the proclamations and descriptions.

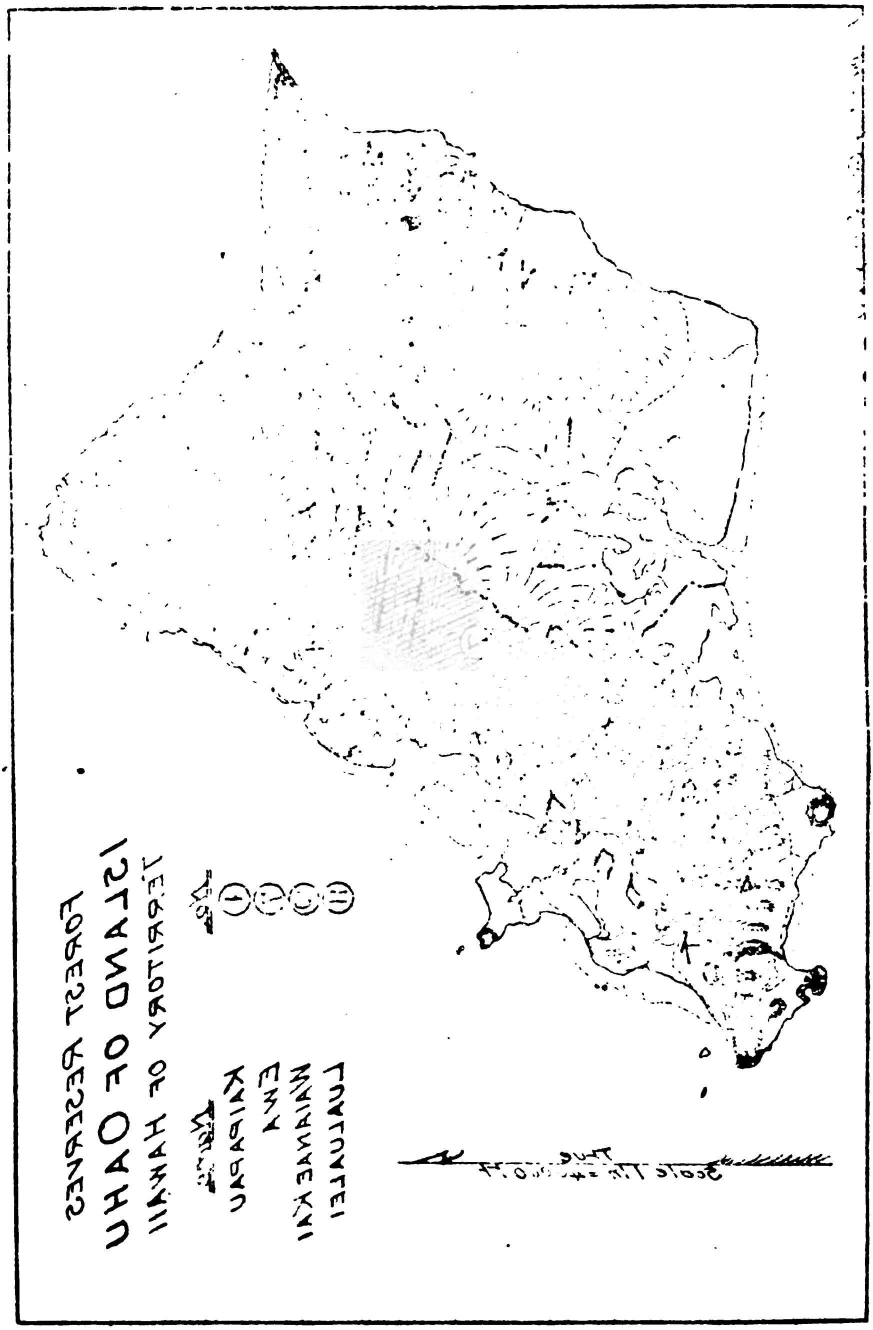
FOREST MAPS.

The twelve established forest reserves are shown on the accompanying maps of the four main islands of the Hawaiian group. The maps were prepared under my direction by the Government Survey Office and are based on the large scale official maps of the several islands.

PRIVATE CO-OPERATION—WAIANAE-KAI RESERVE.

A feature of no small interest in the creation of the Waianae-kai Forest Reserve was the action taken by the Waianae


FOREST RESERVES
ISLAND OF OAHU
TERRITORY OF HAWAII
No. Name
1 KAIPAPAU
7 EWA
10 WAIANAE KAI
11 LUALUALEI
True
Scale 1 In. = 40,000 Ft.
Prepared by Govt Survey Department 1906
WAIANAE
WAIALUA
KOOLAULOA
EWA
KOOLAUPOKO
HONOLULU


FOREST RESERVES
ISLAND OF OAHU
TERRITORY OF HAWAII
KAIPAPAU
EWA
WAIANAE KAI
LUALUALEI
True
Scale

(Plantation) Company to facilitate the actual setting apart of the area. Under an agreement with the Land Commissioner the Waianae Company signed a partial surrender of their lease on the land covered by the reserve, whereby the term of the lease was shortened by one year and so brought within the two-year-limit-of-expiration clause of the forest law.

The Waianae Company has further shown its interest in this reserve by undertaking to reforest, at its own expense, considerable areas on the lower slopes of the mountain within the reserve boundaries. A planting plan for this work has been drawn up by Mr. Haughs and preparations for planting have already begun. For its active support of the forest reserve policy of the Territory the Waianae Company deserves special commendation. It is by such intelligent coöperation that the cause of forestry in Hawaii is strengthened and advanced.

MAUI FOREST LAND SURRENDER.

One of the most notable events of the present year, in view of its far reaching effect, was the turning over to the Government by the plantations in Ceneral Maui controlled by Messrs. Alexander and Baldwin, of the management of certain privately owned lands within the Koolau Forest Reserve. Owing to the fact that several corporations were involved, considerable legal formality attended this transfer, which it took the greater part of the year to bring to completion. The final papers were signed on Nov. 12th, 1906.

In brief the arrangement is that the Paia Plantation, the Haiku Sugar Company, and the Hawaiian Commercial and Sugar Company turn over to the Government for a term of 17 years from Feb. 26th, 1906, the care, custody and control of the privately owned lands of Halehaku, Haiku, Opana and Kaupakulua within the boundaries of the Koolau Forest Reserve, excepting and reserving however (1) all water rights, (2) rights of way for roads, ditches, tunnels, flumes and pipe lines, (3) the right to plant trees, (4) the right to cut fence posts for local use, and (5) the right to make economic use of the forest, subject to reasonable rules and regulations of the Board of Agriculture and Forestry and in a way not inconsistent with the purposes of the reserve. Under each of these clauses are included the rights of ingress and egress. The plantations agree, in addition, to keep the makai boundary of the reserve fenced during the term of the agreement.

The surrender is made contingent on the following points: (1) that the lands surrendered be used by the Government solely for forest purposes, (2) that all government lands within the reserve be set apart now or as soon as may be as parts of the reserve, (the only additional tract that, under the law, can be reserved is about to be set apart), (3) that if all or any portion of the two tracts of government land covered by leases Nos. 538 and 539 revert to the Government during the seventeen years, such lands shall be added to the reserve, and (4) that all government lands within the reserve shall be used only for forest purposes during the period of the surrender, except that the Government may exercise rights similar to those reserved to the plantations. Failure on the part of the Government to comply with these conditions nullifies and terminates the whole agreement. The term of seventeen years expires on the same day as do the leases (Nos. 538 and 539) of the government lands adjoining the private lands surrendered.

The full text of the surrender, which is a lengthy legal document, was published in the Hawaiian Forester and Agriculturist for December, 1906.

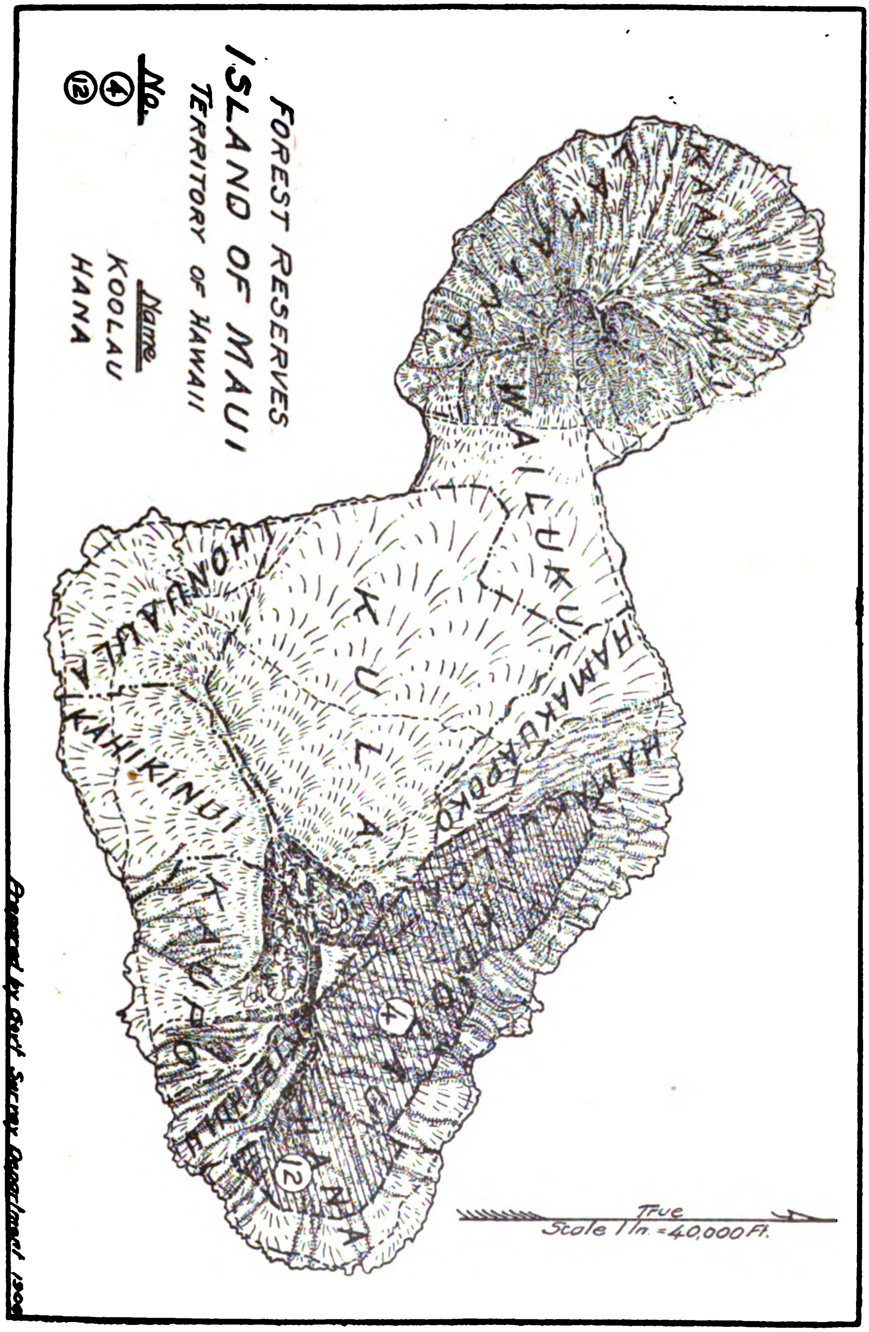
The action taken in this instance will serve as a precedent in future cases, of which it is hoped there will be many, for only by the putting into operation of a systematic and organic plan for the management of any given reserve as a whole, can the best results be attained.

The foregoing statement brings the question to the point on which the whole matter turns, for unless the Government will make it evident that it can exercise an efficient and satisfactory control over the forest reserves, private interests owning land within the reserve boundaries will be slow to agree to turn the management of their lands over to the Board.

FOREST RANGERS.

The establishment of a forest ranger service for the proper administration of the reserves that already exist, or that will

MAP III.


FOREST RESERVES
ISLAND OF MAUI
TERRITORY OF HAWAII
No.
Name
④ KOOLAU
⑫ HANA
KAANAPALI
LAHAINA
WAILUKU
HAMAKUAPOKO
HAMAKUALOA
KULA
HONUAULA
KAHIKINUI
KAUPO
KIPAHULU
KOOLAU
HANA
④
⑫
True
Scale 1 In. = 40,000 Ft.
Prepared by Gov't Survey Department 1906

soon be created is therefore the most pressing need in the forest work of Hawaii today. The necessity for such action is obvious and I cannot too strongly urge that the attention of the Legislature be called to this matter in the most forcible way. Important steps have been taken in getting the reserves established by proclamation, and the boundaries defined more or less thoroughly on the ground, but until an administrative force is actually in commission the reserve system will not have been truly started.

To show how this general question is regarded by the men who as a body have given most careful attention to the forest question in Hawaii, I insert the following resolution unanimously adopted by the Hawaiian Sugar Planters' Association, at the annual meeting held in Honolulu during November, 1906.

Resolution.

(Adopted by the Hawaiian Sugar Planters' Association, at a meeting held in Honolulu, on Nov. 21, 1906).

"Resolved, That the Hawaiian Sugar Planters' Association hereby expresses its hearty approval of the policy of setting apart forest reserves, inaugurated and now being prosecuted by the Territorial authorities;

"That it is the opinion of this Association that said policy should be supplemented:

"(1) By providing rangers to guard and protect such reserves from fire, trespassers and depredation;

"(2) By the initiation of systematic reforesting of such portions of said reserves as are not now covered with trees;

"That we hereby petition the Legislature of the Territory to make adequate appropriations for the purposes aforesaid."

FOREST RESERVE PROJECTS.

As I pointed out in my last annual report, the table of forest reserves actually established at any one time is not a true index by which to measure the work accomplished to that date. As this report goes to press there are several projects that need only a little more work to bring them to a head, and so into the list of reserves established.

Na Pali-Kona, Kauai.

The proposed Na Pali-Kona reserve on Kauai is one of these. This proposed reserve embraces the greater part of the mauka portion of the Na Pali and the western end of the Kona Districts on Kauai. It covers an area of 60,040 acres. A large proportion of the reserve is government land under lease for some years to come but 3,980 acres in Na Pali can be now actually set part.

All the section covered by the proposed reserve is under forest cover;most of it is heavily wooded. Both the leased government and the fee simple lands have for some time been maintained as private forest reserves by the lessees or owners, who have driven out the wild cattle or exterminated them.

The object of the proposed Na Pali-Kona Reserve is to protect the watersheds of the important streams on the leeward side of Kauai, which from their volume and fall are of very great value in the development of that island. Somewhat used at present for irrigation these streams are capable of being harnessed and made to produce immense quantities of power, as well as being made use of more extensively for irrigation. The project only awaits the completion of my report to be brought before the Board for action.

Other Forest Reserve Projects on Kauai.

From field work done during the past year I am now prepared to report upon a forest line through the Districts of Kona, Puna and Koolau, connecting the existing reserves, above which in my judgment the forest cover ought to be permanently maintained. Surveys are now in progress to define several sections of this boundary. As soon as the descriptions are in hand, reports with recommendations will be submitted to the Board.

Proposed Forest Reserves on Oahu.

Several small reserves are projected on the Waianae Mountains, which when completed will result in the reservation of nearly the whole of the upper part of this range. The proposed Makua-Keaau Reserve only awaits a survey to define its exact

boundaries. The mauka part of Mokuleia is in much the same case, while a survey is now in progress to define the forest boundary on the large private land of Honouliuli.

On the Koolau Mountains arrangements are well under way to extend the existing Ewa Reserve into the Waialua District, and preliminary steps have been taken in regard to reserving the section at the northwest end of the Koolau range.

Maui and Molokai.

Through no lack of interest but because of the press of other work, seemingly of more immediate importance, the status of the forest lands on the West Maui Mountain and on the Island of Molokai has not changed since my last annual report. During 1907 the forest problems in these localities will be studied and the reserve projects brought to the point of action. There is also forest work to be done on the slopes of Mt. Haleakala. This, too, will be taken up during the coming year.

Hawaii.

The Kohala Mountain Reserve project is now the most important reserve work to be done on Hawaii. Progress has been made on this proposed reserve during the year but it still remains for a survey to be made before definite action can be taken on it. The District of Kona has forest problems that claim attention. These it is expected can be taken up early in 1907.

LAND CLASSIFICATION IN RESERVES.

As has already been pointed out the Hawaiian forest reserves contain three classes of land, (1) government land, not leased, (2) government land, leased, and (3) land in private, fee simple ownership. To further elucidate this matter and to make available for ready reference the valuable data contained therein, I append tables showing the several classes of land in each of the established forest reserves. These tables were prepared under the direction of Mr. W. E. Wall, Government Surveyor, by Mr. R. D. King. They are reproduced with Mr. Wall's permission.

TABLE III.

AREAS OF LANDS IN FOREST RESERVES.

(Corrected to December 31, 1906—Prepared by the Survey Department.)

ISLAND OF KAUAI.

RESERVE	LEASE	GOVERNMENT LANDS				PRIVATE LANDS		TOTAL
Name	Number	Leased		Not Leased				
		Acres	Acres	Acres	Acres	Acres	Acres	Acres
Halelea Forest Reserve—								
Wainiha (private)						11,050.00		
Lumahai "						8,975.00		
Waipa "						800.00		
Waioli				*2,650.00				
Hanalei				*8,340.00				
Kalihiwai (private)						5,685.00		
					*10,990.00		26,510.00	37,500.00
Kealia Forest Reserve—								
Anahola	44	*4,018.00						
Kamalomalo	514	*1,033.00						

* Government lands set apart by proclamation as forest reserves.

Leased lands marked * are set apart under the two-year limit of expiration of lease clause.

W. R.—Water rights only are leased.

For additional information regarding leased lands see "List of Public Lands," issued by the Land Department.

TABLE III—Continued—ISLAND OF KAUAI.

RESERVE	LEASE	GOVERNMENT LANDS				PRIVATE LANDS		TOTAL
Name	Number	Leased		Not Leased				
		Acres	Acres	Acres	Acres	Acres	Acres	Acres
Kealia Forest Res.—Con.								
Kealia (private)						2,550.00		
Kapaa	44	*2,334.00						
			*7,385.00				2,550.00	9,935.00
Total, Kauai			*7,385.00		*10,990.00		29,060.00	47,435.00

TABLE III—Continued—ISLAND OF OAHU.

RESERVE Name	LEASE Number	GOVERNMENT LANDS Leased		Not Leased		PRIVATE LANDS		TOTAL
		Acres	Acres	Acres	Acres	Acres	Acres	Acres
Kaipapau Forest Reserve—								
Kaipapau				*913.00				
					*913.00			913.00
Ewa Forest Reserve—								
Wahiawa	530 (W. R.)			*3,978.00				
Waianae uka (U. S. Army Reservation)	68					4,247.00		
Waipio (private)						5,080.00		
Waiawa "						4,040.00		
Manana "						1,090.00		
Waimano				*790.00				
Waiau (private)						1,320.00		
Waimalu "						2,238.00		
Kalauao "						1,538.00		
Aiea	66A	383.00						
Halawa (private)						3,846.00		
			383.00		*4,768.00		23,399.00	28,550.00

TABLE III—Continued—ISLAND OF OAHU.

RESERVE	LEASE	GOVERNMENT LANDS				PRIVATE LANDS		TOTAL
		Leased		Not Leased				
Name	Number	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Waianae-kai Forest Res.—								
Waianae kai	60	*3,150.00						
Waianae kai (grants)						106.80		
			*3,150.00				106.80	3,256.80
Lualualei Forest Reserve—								
Lualualei				*3,743.00				
					*3,743.00			3,743.00
Total, Oahu			3,533.00		*9,424.00		23,505.80	36,462.80

TABLE III—Continued—ISLAND OF MAUI.

RESERVE Name	LEASE Number	GOVERNMENT LANDS Leased Acres	 Acres	 Not Leased Acres	 Acres	PRIVATE LANDS Acres	 Acres	TOTAL Acres
Koolau-Maui Forest Res.—								
Opana (private)						10,899.00		
Peahi "								
Haiku "								
Halehaku "						1,840.00		
Honopou-W. Makaiwa	475 (W. R.)			*4,800.00				
E. Makaiwa-Keopuka	267B (W.R.)			*1,400.00				
Honomanu	52	2,000.00						
Keanae, Mauka	539	8,750.00						
Wailua, 1 and 2 Mauka	539	1,280.00						
Wailua-Ulaino Forest	538	3,000.00						
" " "	492	900.00		*8,100.00	Lease 520B W. R			
		———	15,930.00	———	*14,300.00	———	12,739.00	42,969.00
Hana Forest Reserve—								
Hana Forest	492	6,330.00		*5,242.00				
W. Honomaele (private)						187.00		
E. Honomaele	474	15.00		*115.00				
Kawela-Kaeleku		65.00						
Wakiu	518	3.00		*15.00				
Aleamai (private)						357.00		

TABLE III—Continued—ISLAND OF MAUI.

RESERVE	LEASE	GOVERNMENT LANDS				PRIVATE LANDS		TOTAL
Name	Number	Leased		Not Leased				
		Acres	Acres	Acres	Acres	Acres	Acres	Acres
Hana Forest Reserve—Con.								
Haneoo (private)						84.00		
Kakjo				*700.00				
Waiohonu				*33.00				
Puukai-Papahawahawa				*68.00				
Muolea (private)						430.00		
Koali-Puuhaoa	479B	600.00						
Wailua	583 (W. R.)			*270.00				
Puaaluu				*311.00				
			7,013.00		*6,754.00		1,058.00	14,825.00
Total, Maui			22,943.00		*21,054.00		13,797.00	57,794.00

TABLE III—Continued—ISLAND OF HAWAII.

RESERVE	LEASE	GOVERNMENT LANDS				PRIVATE LANDS		TOTAL
		Leased		Not Leased				
Name of Land	Number	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Hamakua Pali Forest Res'r'e								
Laupahoehoe Nakooka Apua Waikapu Honopue	560 (W.R.)			*10,533.20				
Laupahoehoe (private)						2,350.00		
Waimanu	524	200.00						
Waimanu:—kuleanas and homesteads						256.80		
Waimanu and Muliwai, including the private ili of Kekealani, (unsurv'yed)				*5,600.00				
		——	200.00	——	*16,133.20	——	2,606.80	18,940.00
Hilo Forest Reserve—								
Humuula	75	3,901.00						
Kahoahuna				46.00				
Waipunalei, (private)						1,470.00		
Laupahoehoe - Weloka Forest				*11,845.00				
Maulua, (private)						7,989.00		

TABLE III—Continued—ISLAND OF HAWAII.

RESERVE Name	LEASE Number	GOVERNMENT LANDS Leased Acres	 Acres	 Not Leased Acres	 Acres	PRIVATE LANDS Acres	 Acres	TOTAL Acres
Hilo Forest Reserve—Con.								
Waikaumalo—Maulua ..	....	....	....	790.00	....	....	....	....
Piha	442	3,780.00	....	....	....	....	....	....
Nanue (private)	....	....	....	....	....	145.00	....	....
Honohina (private)	....	....	....	....	....	5,555.00	....	....
Opea-Peleau...........	....	....	....	230.00	....	....	....	....
Umauma (private)	....	....	....	....	....	1,561.00	....	....
Kamaee-Wailua........	....	....	....	930.00	....	....	....	....
Hakalau (private)	....	....	....	....	....	9,826.00	....	....
Wailea-Kaiwiki	....	....	....	3,834.00	....	....	....	....
Honomu-Kuhua Forest..	....	....	....	*926.00	....	....	....	....
Makahanaloa (private)...	....	....	....	....	....	3,949.00	....	....
Onomea " ...	....	....	....	....	....	773.00	....	....
Kahalii " ...	....	....	....	....	....	183.00	....	....
Papaikou " ...	....	....	....	....	....	10,269.00	....	....
Pahoehoe " ...	....	....	....	....	....	176.00	....	....
Paukaa " ...	....	....	....	....	....	6,221.00	....	....
Kikala " ...	....	....	....	....	....	90.00	....	....
Kalalau " ...	....	....	....	....	....	918.00	....	....
Puueo (private)	....	....	....	....	....	436.00	....	....

TABLE III—Continued—ISLAND OF HAWAII.

Reserve	Lease	Government Lands				Private Lands		Total
Name	Number	Leased		Not Leased				
		Acres	Acres	Acres	Acres	Acres	Acres	Acres
Hilo Forest Reserve—Con.								
Piihonua	103	33,941.00						
Punahoa (private)						216.00		
		——	41,622.00	——	18,601.00	——	49,777.00	110,000.00
Honuaula Forest Reserve—								
Honuaula				*665.00				
				——	*665.00			665.00
Kau Forest Reserve—								
Puumakaa–Kiolakaa Forest	550	5,750.00						
Waiohinu	151	10,740.00						
Kahilipalinui (private)						165.00		
Kawala–Kaunamano				*380.00				
Kioloku				*216.00				
Hionaa–Hokukano Mauka				*345.00				
Kaalaiki Forest				*10,705.00				
Hilea-nui (private)						2,620.00		
Hilea-iki "						37.00		
Ninole–Wailau Forest				*5,680.00				
Punaluu (private)						1,275.00		

TABLE III—Concluded—ISLAND OF HAWAII.

RESERVE	LEASE	GOVERNMENT LANDS				PRIVATE LANDS		TOTAL
Name	Number	Leased		Not Leased				
		Acres	Acres	Acres	Acres	Acres	Acres	Acres
Kau Forest Reserve—Con.								
Mohokea, 1 and 2	454	*1,875.86	....	....	....	....	....	....
Moaula-Kopu-Makaka, Mauka	578	46.40	....	*7,379.74	....	....	....	....
Paauau 2 (private)	....	....	....	....	....	1,675.00	....	....
Kaauhuhuula Forest	....	....	....	*2,332.00	....	....	....	....
Keaiwa (private)	....	....	....	....	....	460.00	....	....
Kaalaala-Makakupu Forest	555	7,122.00	....	....	....	....	....	....
Kapapala	106	*7,046.00	....	....	....	....	....	....
			32,580.26		*27,037.74		6,232.00	65,850.00
Total, Hawaii	....	....	74,402.26	....	62,436.94	....	58,615.80	195,455.00

* Government lands set apart by proclamation as forest reserves.

Leased lands marked * are set apart under the two-year limit of expiration of lease clause..

W. R.—Water rights only are leased.

For additional information regarding leased lands see "List of Public Lands," issued by the Land Department.

TABLE IV.

AREAS OF LANDS IN FOREST RESERVES.

(Corrected to December 31, 1906.)

Prepared by the Survey Department.

SUMMARY.

RECAPITULATION

BY ISLANDS

ISLAND OF KAUAI.

Halelea Forest Reserve:	Acres	Acres
Government Lands, not Leased	10,990.00	
Private Lands	26,510.00	
		37,500.00
Kealia Forest Reserve:		
Government Lands, Leased	7,385.00	
Private Lands	2,550.00	
		9,935.00
Total		47,435.00

ISLAND OF OAHU.

Kaipapau Forest Reserve:		
Government Lands, not Leased ...	913.00	
		913.00
Ewa Forest Reserve:		
Government Lands, Leased	383.00	
Government Lands, not Leased	4,768.00	
Private Lands	23,399.00	
		28,550.00
Waianae-kai Forest Reserve:		
Government Lands, Leased	3,150.00	
Private Lands	106.80	
		3,256.80
Lualualei Forest Reserve:		
Government Lands, not Leased	3,743.00	
		3,743.00
Total		36,462.80

ISLAND OF MAUI.

Koolau Forest Reserve:		
Government Lands, Leased	15,930.00	
Government Lands, not Leased	14,300.00	
Private Lands	12,739.00	
		42,969.00
Hana Forest Reserve:		
Government Lands, Leased	7,013.00	
Government Lands, not Leased	6,754.00	
Private Lands	1,058.00	
		14,825.00
Total		57,794.00

ISLAND OF HAWAII.

Hamakua Pali Forest Reserve:		
Government Lands, Leased	200.00	
Government Lands, not Leased	16,133.20	
Private Lands	2,606.80	
		18,940.00
Hilo Forest Reserve:		
Government Lands, Leased	41,622.00	
Government Lands, not Leased	18,601.00	
Private Lands	49,777.00	
		110,000.00
Honuaula Forest Reserve:		
Government Lands, not Leased	665.00	
		665.00
Kau Forest Reserve:		
Government Lands, Leased	32,580.26	
Government Lands, not Leased	27,037.74	
Private Lands	6,232.00	
		65,850.00
Total		195,455.00

GRAND SUMMARY

BY ISLANDS

	Acres	Acres
ISLAND OF KAUAI—		
Leased	7,385.00	
Not Leased	10,990.00	
Private	29,060.00	
		47,435.00
ISLAND OF OAHU—		
Leased	3,533.00	
Not Leased	9,424.00	
Private	23,505.80	
		36,462.80
ISLAND OF MAUI—		
Leased	22,943.00	
Not Leased	21,054.00	
Private	13,797.00	
		57,794.00
ISLAND OF HAWAII—		
Leased	74,402.26	
Not Leased	62,436.94	
Private	58,615.80	
		195,455.00
		337,146.80

BY CLASSES OF LAND

Islands	GOVERNMENT LANDS		PRIVATE LANDS
	Leased	Not Leas'd	
	Acres	Acres	Acres
Kauai	7,385.00	10,990.00	29,060.00
Oahu	3,533.00	9,424.00	23,505.80
Maui	22,943.00	21,054.00	13,797.00
Hawaii	74,402.26	62,436.94	58,615.80
	108,263.26	103,904.94	124,978.60
		337,146.80	

Acknowledgment.

Apropos of these tables I would this year again express my appreciation of the assistance given this Department by the Survey Office. Mr. Wall has taken an active interest in the forest reserves and in detailing members of his staff, particularly Messrs. F. E. Harvey, G. F. Wright and R. D. King, to do forest work, has enabled me to bring to completion several projects that would otherwise have been delayed into 1907.

Proposed Amendment of Forest Law.

As was pointed out at some length in the 1905 report the forest laws should be so amended as to permit the Governor to set apart all government lands within the boundaries of established forest reserves, whether or not they are under lease; it being provided in the case of leased lands that the reservation be subject to the terms of the lease and not effective until the expiration thereof. Such an amendment would materially strengthen the forest reserve policy.

FOREST RESERVE MONUMENTS.

To properly and permanently mark the main points along the forest reserve boundaries, metallic forest reserve monuments have been manufactured, consisting of two galvanized iron pipes, each 4½ feet long, and respectively 2½ and 3 inches in diameter. The smaller pipe is set in the ground, the larger fitting over it and held in place by a bolt secured by a brass railway switch padlock. The upper pipe carries a metal target with the letters F. R. T. H. (Forest Reserve, Territory of Hawaii). When set in place the monument is given a coat of white enamel paint. The upper pipe being detachable permits the use of the point as a station in survey work.

During 1906 sixty-nine forest reserve monuments were erected on the boundaries of eight forest reserves. Distributed by islands, the list of monuments is as follows: Kauai 29, Oahu 17, Hawaii 23.

FOREST EXTENSION.

The second main branch of the work of the Division of Forestry is Forest Extension. This includes the cooperative assistance that the Division is prepared to render persons desiring to establish forest plantations or to conduct their forest work in accordance with the methods of forestry, and also the introduction and distribution of exotic and other seeds and plants of value to the Territory.

This Section is under the direct charge of Mr. David Haughs, Forest Nurseryman, whose own report should be consulted for the details of the work. Briefly summarized the accomplishments of the past year are as follows:

COOPERATIVE ASSISTANCE.

Under the terms of Circular No. 1 of the Division of Forestry, issued in December, 1905, thirty-nine applications in all have been received for advice and assistance in forest planting. In answer to the more important of these requests Mr. Haughs has made five trips during the year to the other islands and three to points on Oahu, during which he has visited and examined nineteen tracts. In most cases the suggestions made verbally while going over the ground have been followed by a written report or by a detailed planting plan. Fourteen such reports have been prepared during 1906. Besides the applications for advice regarding large tracts, twenty persons in and around Honolulu have been given assistance of one sort or another in forest or nursery work, and a considerable number more have received information by letter, or in person during visits to the Nursery.

One of the most encouraging features of this work is the attitude taken by some of the large corporations. In undertaking forest planting these companies show a commendable foresight which will surely bring returns in later years, when the wood supply becomes an even more important factor than it is today.

In making the examinations the attempt is made so far as possible, to arrange that applicants in one part of the Territory shall be visited during one trip; in this way both time and expense are saved. On his trips to the other islands, Mr. Haughs has been able to gather much valuable information in regard to the success or failure of forest plantations started in former years. The systematic collection of data of this character is of great importance, for when properly put together and published they give a definite basis on which to rest present forest work.

Properly included under this general head is a trip to Hawaii made by me in October to discuss on the ground with the manager of the company plans for logging the Koa timber on the Bishop Estate Tract of Keauhou, in Kau. This trip occupied ten days. On my return I appeared before the directors of the Hawaiian Mahogany Lumber Company and made a verbal report, approving the plan of operations outlined by Mr. E. H. Cant, the manager. The statement there made was also furnished Mr. Cant, in the form of a letter.

In reply to an application from the same company for a report upon the Koa in the Kona District on Hawaii, a report outlining the general policy of the Division of Forestry in regard to lumbering in Hawaii was prepared early in September. This report, approved by the Board, appeared in the Hawaiian Forester and Agriculturist for November, 1906.

Press Bulletins.

As an aid to tree planters, there was published in November, 1906, a four-page press bulletin by Mr. Haughs (Press Bulletin No. 4 of the Division of Forestry) entitled "Instructions for Propagating and Planting Forest Trees." This leaflet describes in a concise way the methods which should be followed in the nursery and in the field to secure success in tree planting.

Earlier in the year, in February, a "Revised List of the Forest and Ornamental Tree Seed for Sale at the Government Nursery" was issued as Press Bulletin No. 3 of the Division of Forestry. Both these are intended to be used with, and to supplement Circular No. 1, the "Offer of Practical Assistance to Tree Planters."

COLLECTION, SALE AND DISTRIBUTION OF SEED AND PLANTS.

The past year has also seen an advance in the matter of seed collection and distribution. The local work has been further systematized so that now seed of all the more important native and introduced trees is collected as it becomes ripe and kept on sale at very moderate prices. Whenever possible it is the intention to collect seed from Hawaiian grown trees rather than to import it, thus at once securing fresh seed and profiting by any advantage that may come from acclimatization. But unfortunately not all of the introduced trees are yet in bearing, nor do all those that are, produce seed regularly. In such cases it is the aim of the Division to import and keep on hand enough seed to satisfy the probable demand.

In the introduction of seed of new or little known exotic plants the present year has seen a marked development, not so much in actual receipts as in the perfection of arrangements to exchange with botanic gardens and other similar institutions in various parts of the world, especially in the tropics. Collections of native Hawaiian seeds made for the Division of Forestry have been sent to a number of these institutions, in return for which it is expected that valuable additions to the stock will be received.

As has been pointed out in earlier reports the introduction of new trees is one of the most important lines of work to be taken up in the Territory. It is capable of almost unlimited expansion and later should be given a prominent place in the activities of the Division. For the present it is believed that the greatest amount of good to the Territory will result from following up the offer of cooperative assistance. Later, the Division of Forestry can well leave the planting of private lands wholly to the private owner and devote its attention to more technical forest work.

Free Distribution of Seed and Plants.

The sale of seed and plants from the Government Nursery resulted during 1907 in the realization of $291.28. This sum was turned into the General Treasury of the Territory.

Free distribution of seed and especially of plants to schools and to improvement clubs has been continued. For Arbor Day, November 2nd, 1906, 2,580 plants were distributed. During the remainder of the year 7,177 more plants were given to homesteaders, improvement clubs, schools and others; in all a total of 9,757 plants given gratis.

RUBBER EXPERIMENTS.

The wording of the item appropriating money for the current expenses of the Board of Agriculture and Forestry for the present fiscal period makes mandatory "experimenting in growing rubber trees on government forest lands."

In compliance with this law and in response to a general demand for such information, the Division of Forestry has undertaken three kinds of rubber experiments: (1) A systematic trial of Ceara Rubber (*Manihot glaziovii*) in various localities throughout the Territory to ascertain definitely where this species will and will not grow; (2) The importation of seed or seedlings of other rubber producing trees, followed by propagation and distribution; and (3) Systematic experiments in tapping rubber trees that have reached sufficient size to be so treated.

In the Ceara experiment sample lots, usually of 25 seed each, were sent to ninety-four persons, who agreed to report from time to time upon the growth of the trees and other facts of interest. In a few cases where exceptionally favorable conditions for the experiment obtained larger quantities were given. In reply to a card of inquiry, figures are now being received showing the height and diameter which the trees have attained in six months. These figures will be tabulated and soon published in the form of a circular.

After several unsuccessful attempts to secure seed or plants of the Para and Central American species (*Hevea brasiliensis*) and (*Castilla lactiflua*) respectively, plants of both kinds are now being propagated at the Government Nursery. These will eventually be placed in various situations where they can be watched and noted. The Castilla seed was purchased in Ceylon through Mr. Jared G. Smith. The Para plants are from a consignment of stumps that arrived at this port in such poor condition that the consignees refused to accept it. The plants were accordingly put up at auction by the Customs officials. They were bid in by Mr. Alexander Craw, Superintendent of Entomology, who turned them over to this Division. Although in very unpromising condition when received, by careful attention many have been saved and are now doing well.

The most important question in connection with the rubber industry in Hawaii is whether or not the trees will yield rubber in commercial quantities. This is, of course, the vital point in the whole matter and until it is demonstrated one way or the other, the industry must remain in the experimental stage. In connection with the investigation of the planted forest at Lihue, made during the past summer by the Division of Forestry, the attention of the public was brought to two groves of Ceara Rubber trees of sufficient size to tap. Arrangements were at once made for careful experiments to determine the yield of these trees. These experiments will soon be begun and will be carried on under the joint direction of this Division and the Federal Agricultural Experiment Station, as that office has a man available to conduct the experiment and this Board has not. The results of this work will be made public as soon as enough definite information is obtained to warrant publication.

The Ceara groves at Lihue are the only ones in the Territory where enough trees of the necessary age and size are to be found to make the results of value. Each grove contains about fifty trees large enough to tap.

NUUANU VALLEY.

The work of the Division of Forestry in Nuuanu Valley during 1906 as for two preceding years, has consisted in caring for the forest plantations already established rather than in planting more trees. It is gratifying to note that the care that has been given the young trees is now bearing fruit in their sturdy appearance and thrifty habit. Especially is this seen in the lower part of the plantation, but even where more exposed to the wind the trees are now making a satisfactory growth. Two laborers are kept at the Forester's cottage to look after the Nuuanu work. This arrangement will be continued during the coming year.

TANTALUS FOREST.

The most notable feature of the past year in connection with Tantalus is the greater protection that has been afforded both the planted forest and the native growth higher up by the forest ranger who, since March, has made a daily round of the section. Owing to the occurrence of several small forest fires on Tantalus early in the year, a period of special fire danger for the Tantalus District was declared under date of February 8, and since then permits have been required for the burning of brush. In each case where a permit is given the ranger personally supervises the burning and sees that it is done properly. In a report upon his district the local fire warden, Mr. W. M. Giffard, says:

"I consider that the absence of forest fires in the Tantalus section and its immediate neighborhood during the excessively dry period we have had, is due to the regulations established by the Commissioners of Forestry, whereby a forest police ranger was appointed and the numerous lot owners in the residential section of Tantalus were requested to secure permits from the District Fire Warden before they were allowed to burn off brush on their premises. The Forest Police Ranger has faithfully attended to the carrying out of the regulations, and as no two permits were ever granted for the same day, he has been able to personally supervise the burning of rubbish and brush for which permits were applied. The carelessness of the overseers in charge of these premises in the past in allowing a burning pile of brush, etc., to take care of itself, while they either left the premises or attended to other work, was the cause of practically all of the fires which have occurred on Tantalus in recent years. The presence of the Forest Police Ranger has a salutary effect on these overseers, all of whom are Japanese, for they are now compelled to stay by the burning piles of brush so long as any fire remains.

"During the period named, the District Fire Warden has issued thirty-one permits to the property owners in the district for the burning of brush fires. The Ranger reports that there has been only one infringement of the regulations since these were established, which would tend to show that the property owners in this district are, as a whole, inclined to coöperate with the Department.

"In addition to his daily duties of policing the forest section of Tantalus and Makiki, the Forest Ranger has cut several miles of trails through the thickest of forest undergrowth, in order to allow access to the upper ranges in case of fires starting there during dry weather. He has furthermore protected from destruction much undergrowth and many young trees which in the past have been, to a very great extent, ruthlessly destroyed by pleasure seekers."

The acquisition by the Territory of the Coney Estate property on Tantalus, on which is the larger part of the Eucalyptus forest, has not yet taken place, but during the year some progress has been made looking thereto. It is earnestly to be hoped that by an equitable exchange this tract can be secured by the Government.

MISCELLANEOUS FOREST WORK.

With an increased appropriation and a large staff the Division of Forestry could undertake much work of benefit to the Territory which can now be given only aggravatingly scant attention.

But even under the present conditions there are gradually being accumulated materials for the collections needed for reference or that illustrate the forest work. Additions to the herbarium, to the reference collection of native and exotic seed, and to the forest photographs have been made during the year, and more notes have been taken on the times and duration of the period during which the important trees and shrubs are in flower and fruit.

INVESTIGATION OF THE PLANTED FOREST AT LIHUE.

Perhaps the most important thing to be recorded under the head of miscellaneous forest work is the investigation of the planted forest at Lihue, Kauai, undertaken during the summer of 1906, under the immediate charge of Mr. Charles S. Judd, of Honolulu, a senior in the Yale Forest School, who was appointed Special Forest Agent in the Division of Forestry for a temporary period of two months and a half (July 23 to September 30). The investigation consisted in the careful measurement of the trees on sample plots in the various types of planted forest on the lands of the Lihue Plantation

Company and of Grove Farm. From the data collected can be compiled tables of volume and yield—which based on what this forest has produced, may be used in computing what may be expected from other plantations of the same species grown under similar conditions.

The results of the investigation will appear as a bulletin of the Division of Forestry. This is now being prepared.

PUBLICATIONS.

One of the ways in which the Division of Forestry makes its work of value to the Territory is by issuing publications dealing with various phases of forestry in the islands.

The list of publications of the Division of Forestry issued during 1906 is a short one, the preparation of several circulars which it was expected could be published during the year having been unavoidably delayed. It is as follows:

Press Bulletin No. 3. A "Revised List of the Forest and Ornamental Tree Seed for Sale at the Government Nursery," 4 pp. Issued February, 1906. (1,500 copies.)

Press Bulletin No. 4. "Instructions for Propagating and Planting Forest Trees," by David Haughs. 4 pp. Issued November, 1906. (1,000 copies.)

Report of the Division of Forestry for the year ending December 31, 1905. (Reprinted from the Second Report of the Board of Commissioners of Agriculture and Forestry.) Issued Novmber, 1906. (500 copies.)

REPORTS AND OCCASIONAL PAPERS.

During 1906 routine reports outlining the work of the Division of Forestry have been submitted at each regular meeting of the Board. These are subsequently published in the Hawaiian Forester and Agriculturist. The Forest Nurseryman has also submitted weekly reports covering in more detail what has taken place in his section.

Special reports and papers on forestry in Hawaii have, by request, been prepared by the Superintendent of Forestry for publication in the annual report of the Governor to the Secretary of the Interior, and for delivery before the Honolulu High School on Arbor Day, and before the Hawaiian Sugar Planters' Association at its annual meeting.

An address on "Some Forest Problems in Hawaii" was delivered by the Superintendent of Forestry, in Washington, D. C., in April, before the national organization of professional foresters, The Society of American Foresters.

EXHIBIT AT THE POULTRY SHOW.

On December 20 to 22 the Hawaiian Poultry Association held its annual exhibition in Honolulu, this year with the coöperation of the Farmers' Institute and the Board of Agriculture and Forestry.

The exhibit made by the Division of Forestry attracted a due share of attention and elicited considerable favorable comment. It consisted of a series of maps and charts showing the location and area of the established forest reserves; a collection of seed and seedlings of forest trees and other plants, illustrating the methods in use at the Government Nursery; examples of the forest fire and other warning notices, printed on cloth for posting along the forest reserve boundaries and elsewhere in the Territory; and a forest reserve boundary monument, used to mark the important points on the reserve lines. A case containing the publications of the Board also formed a part of the exhibit and packages of various circulars and press bulletins of the several divisions were left in trays for free distribution.

The space allotted to the Division consisted of a four-foot wide table about thirty-five feet in length, with a wall space behind, corresponding in length to the table.

The maps used in the exhibit were especially prepared for the purpose by the Government Survey Office. They were based on the maps made to accompany the report of the Governor to the Secretary of the Interior, for the year ending June 30, 1906. The maps and charts are now hung in the office of the Board.

DISTRICT FORESTERS.

During 1906 the following changes have taken place in the personnel of the corps of District Foresters:

Resignations.

Resignations have been received from Messrs. F. W. Carter of South Kohala, Hawaii, and G. C. Munro of Molokai, because of change of residence; and from Mr. C. Bolte of Koolaupoko, Oahu, because through change of ownership he was no longer directly interested in that section.

Appointments.

To succeed those resigning the following gentlemen were appointed: Mr. E. E. Conant to succeed Mr. Carter; Mr. James Munro to succeed his brother, and Mr. W. C. Weedon to succeed Mr. Bolte. Mr. T. S. Kay was also appointed, in February, to the position left vacant by the resignation of Mr. E. E. Olding of Kohala, in the latter part of 1905.

The new appointments are as follows: *Kauai,* Messrs. A. F. Knudsen, Walter D. McBryde and Edward Broadbent; *Molokai,* east end, Mr. C. C. Conradt; *Maui,* Mr. C. J. Austin.

In each case but one the new appointees have districts resulting from the breaking up of larger ones. This has, of course, necessitated a change of boundaries with other district foresters than those named. On another page of this report will be found a corrected list of all the district foresters, with their respective jurisdictions. The list numbers forty names.

Interesting reports have been received from a majority of the district foresters. These are printed elsewhere in this volume.

FOREST FIRE SERVICE.

Fortunately the past year has been relatively free from forest fires and those that have occurred have been checked in season to prevent any great damage. The freedom from fire is without question due in part, if not in large part, to the forest fire law enacted by the Legislature of 1905. The knowledge that there existed a law providing penalties for damage resulting from the careless use of fire, behind which stood a branch of the Government, represented locally by the district fire wardens, ready to see that the law was enforced has had unquestionably a salutary influence on the class of persons to whose doors forest fires can usually be traced.

In connection with this statement the following resolution, adopted by the Board of Agriculture and Forestry on March 22, 1906, may be cited:

"Resolved, that the Superintendent of Forestry be, and he is hereby instructed, without further action by the Board, upon each occasion when brush or forest fires take place, to make investigations, either in person or through the local fire wardens, as to the origin of each such fire; and if in any case the facts appear to warrant further investigation or prosecution, to request the assistance of the appropriate police authorities and prosecuting attorneys to secure evidence and prosecute the persons found responsible for such fires."

PERIOD OF SPECIAL FIRE DANGER.

As a result of the prolonged dry weather early in the year advantage was taken in three cases of the section of the Forest Fire Law (Section 6, Act 71 of the Sessions Laws of 1905), which provides that in times or localities of particular fire danger a special warning may be issued, that during a specified time fires to burn brush, etc., shall not be started unless the written permission of the District Fire Warden shall have been first obtained. Acting under this authority the Chief Fire Warden issued special warnings as follows:

For a portion of the Waialua District, Island of Oahu, for a period of six months from March 7, 1906;

For a portion of the Ewa District, Island of Oahu, for a period of six months from March 17, 1906; and

For a portion of the Waianae District, Island of Oahu, for a period of six months from March 23, 1906.

There was also issued on February 8, 1906, for the period of 12 months, a special warning covering the section between Manoa and Pauoa Valleys in the District of Kona, on Oahu. This includes Tantalus Heights and the planted forest below.

Permits to burn brush under these special warnings were isued as follows: Waialua none; Ewa, one; Waianae, none; and Tantalus, to November 30, 1906, thirty-one.

Special warning notices in English, Hawaiian, Portuguese and Japanese were printed on cloth and posted in each of these four districts, calling attention to the period of special danger. The regular fire warning notices have been kept in evidence throughout the Territory.

RECORD OF THE YEAR'S FIRES.

In answer to a letter from the Chief Fire Warden requesting data in relation to forest fires from January 1 to November 30, 1906, letters have been received from 37 out of the 50 district fire wardens.

From the information so received and from data already in the office the following list has been prepared ,which is believed to be a practically complete record of the forest fires of 1906, certainly of all the important ones. Twenty-five fires are recorded in the list.

February 5, Tantalus Heights, Kona, Oahu.

Grass fire, 3 to 5 acres. Started from a fire for burning brush on the lot owned by Hon. C. H. Dickey. Stopped just before it got to the edge of the forest. Fifteen men called out. The men from the Government Nursery were paid $6.00 by the Board. The rest were paid by Senator Dickey.

February 13, Tantalus Heights, Kona, Oahu.

Heavy smoke from several piles of burning brush on the property of Mr. T. Clive Davies made it appear from town that a big fire had started on Tantalus. A force of 22 men was accordingly sent up to fight it. No damage, except loss of time and expense of the men called out. This fire cost the Board $9.50.

March 3, Grant 973, Waialua, Oahu.

Grass fire, 25 acres. Probably set to burn off dead grass and improve pasture. Put out by a Waialua Agricultural Company luna and three laborers. No damage was done, but says the District Fire Warden, "Had the fire got half an hour's' better start I believe it would have been as disastrous as the Wahiawa fire of March, 1905."

March 7, Paauhau, Hamakua, Hawaii.

Brush and grass fire in open and largely burned over forest. on land owned by the Parker Ranch. About 1,000 acres. This fire was started by sparks carried by a sudden and severe Kona wind storm from brush fires for burning German ivy. The clearing of ivy had been going on for four months under proper precautions and except for the sudden wind there would have been no danger. A large gang of men was at once set to work and aided by rains checked the fire and the next day had it under control. Paauhau Sugar Plantation had 300 men at work for one day protecting the upper cane fields from the fire beside others who assisted the Parker Ranch gang in keeping the fire within certain bounds.

As most of the area burned over had been severely injured by previous fires the direct loss from this fire was mainly the expense for labor. This fell on the Parker Ranch and on the Paauhau Sugar Plantation Company. The expense to the latter is estimated at $250.00.

March 7, Pakua Hill, Hilea, Kau, Hawaii.

On the night of March 7, a fire burned off the forest on the top of the Pakua Mauka Hill and also 23 acres of cane on Makanau Hill, directly makai. The fire is supposed to have started from the house of a Chinese taro pianter. The plantation called out a force of 473 men to extinguish this fire, at a cost of $376.05. Hard work got it out about noon on March 8. The District Fire Warden says, "It was only by great and repeated efforts that the flames were prevented from escaping into the Ninole and Kaalaiki hills, from whence they would have spread over the whole mountain side, as the woods had been dry as tinder for weeks."

March 7, Puu Oo, Piihonua, Hilo, Hawaii.

On the morning of March 7, two fires were discovered on Mr. W. H. Shipman's ranch; one about half a mile below the Puu Oo house, the other about two miles away toward Halealoha. The ranch men at once started out to fight the fire, but the strong Kona wind hindered the work and the two fires met near Mr. Shipman's line fence and burned over a considerable area; just how much is not stated. As the country burned over was mainly outside the heavy forest the damage was comparatively slight, but the cost of replacing the fences burnt amounted to about $1,000. Certain signs pointed to this fire being of incendiary origin, but no definite evidence could be secured.

March 7, Punahawai, Hilo, Hawaii.

Brush and grass fire, escaped during the Kona storm from a homesteader clearing land. One hundred and twenty-five acres of pasture land owned by the Hilo Sugar Company were burned over. There was no particular damage, as the 40 men called out soon had the fire under control.

March 7, Kukuau 2nd, Hilo, Hawaii.

Brush fire on homestead lot. Burned for two nights and one day, but was controlled without damage to other property.

March 8, Kamae Homesteads, Hilo, Hawaii.

What might easily have been a disastrous forest fire was prevented by the prompt action of the Hakalau Plantation in stopping a fire that started from fires to clear land on the Kamae Homesteads at the time of the Kona storm. Three hundred men were called out and worked for one day, while for two days longer 30 men remained on duty until the fire was entirely extinguished. The expenses incurred in fighting this fire were paid by the Hakalau Plantation Company.

March 9, Hilo District, Hawaii.

Messrs. W. G. Irwin & Company, under the date of March 19, reported that in addition to the fires recorded on March 7, 8 and 9, "several of our managers have reported fires on Waiakea, Onomea and Honomu. On the dates named at the latter place, as in most of the others, the cause was the homesteaders clearing and burning brush without apparently using any discretion as to conditions of weather or prevailing winds." These fires could not have been important as the District Fire Warden for the Onomea section, Mr. J. T. Moir, says that he has no fires to report during the year.

March 11, Palolo Valley, Kona, Oahu.

A grass fire of about 5 acres, on homestead lot No. 16, owned by Mr. Edward Stone, started by children playing with matches in the dry grass. Mr. Stone, assisted by Mr. Charles Hau, owner of a neighboring lot, began to fight the fire as soon as discovered. Soon after, Mr. Haughs arrived on the scene with one man from the Nursery and eleven from the Road Board. After a hard fight of four hours the fire was stopped before it reached the forest. The wages of the laborers at this fire amounted to $25.00; this was paid by the Board.

March 12, Waiakea, Puna, Hawaii.

Grass fire on Waiakea near the beach; about 75 acres burned. Went out as the wind died down; no damage.

March 18, Honokua, Kona, Hawaii.

Forest fire of about 75 acres on the privately owned land of Honokua, at an elevation of about 5,800 feet. The forest was scrubby Koa and Ohia and the damage was regarded as nominal. The fire burned for about ten days and was finally put out by rains. Cause, unknown.

March 30, Nuuanu Valley, Kona, Oahu.

Mr. Haughs, with four laborers from the Nursery, answered a fire call that proved to be a fire in the dwelling house occupied by Mr. W. C. Kapulani. From the appearance of the smoke it looked as if the fire were further up the valley, in the forest.

May 20, Hanalei, Halelea, Kauai.

A small grass fire started by some Chinamen burning rice straw was spreading rapidly toward the forest when put out by a heavy shower. No damage.

July 24, Nuuanu Valley, Kona, Oahu.

A brush fire on the slopes below Pacific Heights was successfully fought and extinguished on the evening of July 24 by Mr. Haughs and three laborers. The area burned over was covered by guava, lantana and grass. No clue could be found regarding the origin of this fire. The cost to the Board of fighting it was $4.00.

August 2, Wahiawa, Waialua, Oahu.

Grass fire of about 2 acres; cause unknown, but thought to be due either to cattlemen or to Japanese charcoal burners. Put out by Mr. A. Anderson and five men employed by the Wahiawa Water Company—the same luna who put out the fire in March on neighboring lands. No damage.

August 12, Halemanu, Waimea, Kona, Kauai.

Grass and brush fire, 4 acres. Started from sparks from a smouldering stump, in a fire to clear land. Stopped by residents and laborers from near-by mountain camps before any serious damage had resulted.

August 16, Country Club, Nuuanu Valley, Kona, Oahu.

A brush and grass fire that might have assumed serious proportions occurred on the hill side above the Country Club on the afternoon of August 16, starting from piles of burning brush left unwatched. The fire was put out by a gang of seven men from the Government Nursery, assisted, when the fire was almost out, by a gang of 20 men from the Road Department. The expense thus incurred, $57.50, was borne by the Country Club.

August, Waimea, Kona, Kauai.

Two grass fires occurred in August on the western side of the Waimea Valley, started by sparks from blasting on the new Waimea ditch. They were put out without any particular damage being done.

September 9, Olomano, Koolaupoko, Oahu.

Brush fire, of about 500 acres, supposed to have been started from a cigar stub or cigarette dropped by some unknown person into dry grass. The fire was stopped by a gang of 14 men from the Maunawili Ranch, under the direction of the local fire warden, Mr. John Herd. The men worked for 6 hours. The cost, $21.00, was borne by the ranch. Fortunately the fire was stopped before it got to the forest, so that the loss of a number of fence posts was the most serious damage. Mr. Herd says, "Had not the laboring force of the Maunawili Ranch been available this fire might have extended itself into the Kailua watershed and the upper Waimanalo cane fields."

September, Waiohinu, Kau, Hawaii.

A brush fire of about 40 acres occurred in the fern growth near the edge of the forest on Waiohinu. Supposed to have been caused by some careless smoker. About 20 men turned out from Waiohinu and Naalehu and worked for a couple of hours to put it out. They received no pay, so far as the local fire warden knows.

October, Wahiawa, Waialua, Oahu.

A brush and grass fire of a few acres, supposed to have been started by a careless smoker, occurred in the gulch at Wahiawa, back of the settlement, early in October. It was put out by Mr. B. O. Clark, with six other men from the Colony and two Japanese. Stopped before any particular damage was done.

December, Kawaihae, N. Kohala, Hawaii.

A brush and grass fire was reported on the grazing land of Kawaihae 1, cause unknown. Put out by Parker Ranch employees.

December, Puna, Hawaii.

Several grass fires are reported as having occurred during the year on grazing lands in Puna. The damage appears to have been slight.

From the above statements it will be seen that in a number of cases only prompt and determined action prevented an incipient fire from spreading over considerable areas of forest and doing much damage. If of value in no other way the forest fire law has brought home to many persons the fact that a forest fire is a danger not to be lightly disregarded, in itself an important step toward the awakening of an intelligent public sentiment. The reports of the fire wardens show, too, that the men who hold the position are not merely nominal appointees, but active agents in seeing that the law is enforced.

What the Fire Wardens Say.

The following extracts from the letters of certain of the fire wardens are quoted because the points brought out are of general interest in connection with this subject.

Mr. Walter F. Dillingham, Ewa, Oahu.

"In view of the fact that during the prescribed fire danger period there were no forest fires in this district, I am led to believe that the regulations in regard to the matter have worked satisfactorily."

Mr. A. Horner, Hamakua, Hawaii.

"I am pleased to be able to report no forest fires in this district the past year. * * * Since the experience with the fires of 1901 the homesteaders have been very careful when burning off. You will likely remember that all fires in 1901 originated in the homesteads."

Mr. James Gibb, Hamakua, Hawaii.

"Considering that five months of the present year have been very dry, we think this district has been very fortunate in having but one fire. We are inclined to think that the vigilance now maintained over the forests of the Territory by the Board of Agriculture and Forestry has made the people in general more careful with fire."

Mr. G. W. McDougall, South Kona, Hawaii.

"If it is the intention of the Government to keep the forest from being destroyed by fire, there will have to be an appropriation for this work, and each fire warden ought to be authorized and allowed to spend fifty or a hundred dollars, to fight fire, at very start of same, i. e. if on government land. By this mode large areas and large expenses can be cut out from being injured, and spent."

POLICY IN REGARD TO FIRE CLAIMS.

Significant action was taken in three cases where bills for expense incurred in fighting forest fires were referred to the Board of Agriculture and Forestry for payment, in that a precedent was thereby established, which will guide future cases. It is the judgment of the Board, expressed at a meeting held on March 22, 1906, "that owners or lessees of fee simple land, and lessees of government land should protect the same from fire at their own expense."

Lack of Appropriation.

It will be remembered that a bill to appropriate $5,000.00 per annum to be used only in cases of emergency, and expended only with the approval of the Governor, was introduced at the last session of the Legislature and failed to pass. Some arrangement should be made at the coming session to provide an appropriation that can be drawn on to combat fires on government land or on private land where if the fire spreads it will endangegr overnment property. As it is now there is no provision for the payment of fire fighting of any kind; a condition which to say the least is highly unsatisfactory.

FIRE WARDENS.

A number of new district fire wardens have been appointed during the year so that now the chain of fire districts is practically complete on each of the islands. There are now fifty district fire wardens. A corrected list appears on another page of this report, giving the name and district of each warden.

PROGRESS OF FORESTRY IN THE TERRITORY.

It has been the custom in past reports to make note of forest work other than that being carried on by the Division of Forestry. Perhaps the celebration of Arbor Day may be noted first under this head.

ARBOR DAY.

By proclamation of the Governor, Nov, 2, 1906 was set apart as the second Arbor Day to be officially observed in Hawaii. While the interest was perhaps not so marked as in 1905, the observance of the day was general and spontaneous, showing conclusively that Arbor Day has come to stay.

The feature of special interest this year was the announcement of the prize winners in the tree planting contest begun on the first Arbor Day in 1905. Made possible by the money contributed by Governor Carter and others, a prize was offered to the grade in each public school planting a tree on Arbor Day, which, as the result of care, should be in the best condition at the end of the year. One hundred and twelve schools, out of a total of 154, qualified as prize winners. The prizes are now being procured under the direction of Mr. W. H. Babbitt, Superintendent of Public Instruction, and will be awarded early in 1907.

Credit should be given Mr. Babbitt for the real interest he has taken in this matter, for to secure a fair judgment and to arrange the necessary details of awarding the prizes, he has cheerfully given his personal attention to an unexpected amount of routine detail.

The Board of Education took an active part in this year's celebration of Arbor Day by paying the freight on the boxes of plants sent out by the Government Nursery to the public schools. This year 2,546 plants were furnished to 68 schools, as against 2,846 to 95 schools in 1905.

KOA LUMBERING.

Two companies are now organized to lumber Koa in Hawaii: the Hawaiian Mahogany Lumber Company, Limited, operating on the Bishop Estate land of Keauhou in Kau and the American Hawaiian Mahogany Lumber Company, operating in South Kona, both on the island of Hawaii. Neither company had begun actual work in the woods on Dec. 31, 1906, but both have taken many preliminary steps so that before long the logging can successfully begin. The similarity in name of the two companies is accidental. The former is an Hawaiian, the latter a California corporation.

FOREST PLANTING.

An awakened interest in forest planting bids fair to become general on the larger sugar plantations. Much work has been done this year, both directly by the plantations and in coöperation with the Division of Forestry. The latter work has already been discussed; for details in regard to the former the reports of the District Foresters should be consulted, especially those of Mr. Walter D. McBryde, Mr. Louis von Tempsky and Dr. J. H. Raymond.

Mention has already been made of the reforestation of a portion of the Waianae-kai Forest Reserve, by The Waianae Company. It is again noted here because it is the first case where forest planting has been undertaken in a forest reserve.

RUBBER.

The interest in rubber continues to increase in the Territory and has led to a number of rubber planting projects, several of which will doubtless result in additional rubber plantations. There is as yet little that can be said definitely about the ultimate success of the industry, but so far as can be judged the outlook is certainly promising.

During the year a number of rubber experts have visited the Territory, among them Dr. Pehr Olsson-Seffer, Director, La Zacualpa (Mexico) Botanical Station and Rubber Laboratory. In an interesting article, published in the Hawaiian Forester and Agriculturist for November, 1906, Dr. Olsson-Seffer discusses the rubber situation in Hawaii and gives his views on the types of rubber plants adapted to the local conditions.

FUTURE PLANS AND RECOMMENDATIONS.

It is the intention to conduct the Division of Forestry during the year 1907 in conformity with the general program that has been followed for the past three years. The creation of forest reserves will go on until the chain of projected reserves is established, continuing until that time to hold the first place in the work of the Division.

Coöperation with private owners in the giving of advice and assistance to those desiring to undertake forest work will also be continued, and additional steps will be taken to arouse interest in tree planting or to stimulate the movement where it already exists.

The experiments with rubber producing trees will be continued and as far as may be the various minor activities of the Division will be carried on.

The use of the Government Nursery as a distributing center for forest trees will be continued, but the effort will constantly be made to encourage the establishment of local nurseries in connection with tree planting work. Ornamental plants will only be grown and distributed for the use of schools or improvement associations, except in the few cases where such plants cannot be obtained from the commercial nurserymen.

RECOMMENDATIONS.

Forest Rangers.

The particular and pressing need of forest work in Hawaii today is the establishment of a corps of paid forest rangers, for the administration and proper protection of the forest reserves already created or that will be established during the coming year. While a larger force would be desirable and will ultimately be necessary, I think that with the appointment of twelve rangers much can be accomplished toward securing the adequate protection and care which is essential if the reserves are to fully realize the objects for which they are set apart.

Furthermore until the Government can assure him that it is prepared adequately to administer its forest property, the private owner will be slow to turn over his forest land to the Government for management. And until the greater part of the land within the boundaries of any given forest reserve is brought under one organic and systematic control, that reserve cannot be made of the greatest possible value to the Territory.

I accordingly most urgently recommend that every effort be made to secure an appropriation from the Legislature sufficient to enable the appointment of a force of forest rangers. It is a matter of extreme importance in the forest work of the Territory. It must be given attention.

Amendments to the Forest Law.

I again recommend that the section of the forest law, covering the creation of forest reserves be so amended as to permit the Governor to set apart government land within the boundaries of established forest reserves whether or not the lands are under lease, provided of course that on lands under lease the reservation be subject to the vested rights under the lease and actually take effect at its expiration. Such a modification of the existing law would, I believe, go far toward strengthening the reserve policy of the Territory.

I recommend that a law be enacted making better provision than at present exists for dealing with forest trespass. The statute of malicious injury at present invoked is not sufficient for many cases that have come up or that are likely to arise in connection with the forest reserves or other government forest land.

Provision should be made for a fund from which could be paid expenses incurred in fighting forest fires on government land or in cases where the fire, if not stopped, would spread over and cause damage to government property. Such a fund should only be used in emergencies and may be safeguarded by restrictions as to how it shall be expended, but it should unquestionably be provided.

With these changes in the law and with an appropriation sufficient to enable the work to be carried on in a systematic way, the Division of Forestry may hope to continue to achieve results of lasting benefit to the Territory and to the people of Hawaii.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry and
Chief Fire Warden.

Report of Forest Nurseryman.

Honolulu, Dec. 31, 1906.

Ralph S. Hosmer, Esq.,
Superintendent of Forestry,
Honolulu.

Dear Sir:—I herewith submit a report of the work done at the Government Nursery, the Nuuanu Station and the Tantalus Forest, including the giving of advice and assistance and other matters, for the year ending December 31, 1906.

THE NURSERY.

COLLECTION OF SEED.

The collecting of tree and shrub seed has been continued during the seeding season, the principal supply having been collected in the neighborhood of Honolulu. Thirteen kinds of native tree seeds have been received from Mr. Robert Hind, Puuwaawaa, Hawaii, and several small donations of seed have been received from a number of people on different parts of the Islands.

Seed Received From Abroad.

At different times during the year sample packages of seed have been received from Dr. F. Franceschi, Santa Barbara, California; W. S. Lyon, Horticulturist, Bureau of Agriculture, Manila, P. I.; E. A. Sterling, Assistant Forester, U. S. Forest Service; Wm. H. Mast, Assistant, Dismal River Forest Reserve; George W. Peavy, Assistant Forest Inspector, U. S. Forest Service; G. French, Nurseryman and Seedsman, Melbourne.

Packages of seed containing all the kinds on hand have been sent to a number of botanic gardens, experiment stations and others in different parts of the world.

Congressional Vegetable Seed.

During the month of January 15,550 packages of vegetable seed were received from the Hon. J. K. Kalanianaole for distribution. Each package contained from five to six kinds of seed in small packets.

There is no doubt that this lot of seed reached more families requiring them and did more good than any previous consignment, principally owing to the assistance given in the distribution by the Superintendent of Public Instruction. A circular letter was sent by Mr. W. H. Babbitt to the principal of each of the public schools of the Territory, asking them to give the number of families represented in each school. Each family desiring vegetable seed was then supplied with an assortment. A notice was also put in the daily papers, stating that vegetable seeds would be sent to any person in the Territory applying for them.

Following is the number of schools supplied, also the number of packages sent to each island:

Islands.	Schools.	Packages.
Hawaii	52	4,354
Maui	25	1,890
Molokai	4	406
Lanai	2	46
Honolulu	10	1,588
Kauai	12	1,190
Oahu	11	1,338
Total	116	10,812

The balance of the seed was distributed to persons calling at this office and others who applied for same by letter.

GROWING AND DISTRIBUTION OF PLANTS.

In addition to the growing and distribution of forest and street trees, which is the principal work under this head, considerable experimenting has been done in the propagation of rubber and various other seeds new to the Islands. One laborer has been regularly employed during the year in the routine work of plant growing and propagation.

Following are tables showing the number of plants given away and sold, and also those sent out for the Arbor Day planting:

Given Gratis.

	Forest.	Fruit.	Ornamental.
Homesteaders	501	62	66
Improvement Clubs	2,300	195	475
Schools	808	...	196
Parks	...	...	240
Others	1,397	441	496
	5,006	698	1,473

Number of plants given gratis........................7,177

ARBOR DAY.

Following is the number of plants sent out for Arbor Day planting, with the number of schools, by islands:

Islands.	Schools.	Plants.
Oahu	30	719
Hawaii	17	581
Kauai	4	53
Maui	13	472
Molokai	4	721
	68	2,546
Others		34
		2,580

Sold.

Forest	Fruit	Ornamental	Total
3,100	47	538	3,685

Summary of Plants Distributed From the Nursery During the Year 1906.

Gratis	7,177
Arbor Day	2,580
Total Gratis	9,757
Sold	3,685
Total	13,442

In addition to the above, about 30,000 seedling Ironwoods, *Casuarina equisetifolia,* in 50 boxes, grown at the Government Nursery, were sold to the Paauhau Plantation for planting on the strip of land along the sea beach, as recommended by the writer.

Under the same arrangement 5,000 seedlings have been started for the Oahu Railway and Land Company, as follows:

Swamp Mahogany *(Eucalyptus robusta)*	1,000
Lemon Scented Gum *(Eucalyptus citriodora)*	250
Red Gum *(Eucalyptus rostrata)*	250
Koa *(Acacia Koa)*	1,000
High level Ironwood *(Casuarina quadrivalvis)*	500
Black Wattle *(Acacia decurrens)*	500
Monterey Cypress *(Cupressus macrocarpa)*	500
Silk Oak *(Grevillea robusta)*	1,000
	5,000

Realization.

During the year there has been collected and deposited with the Treasurer of the Territory as a government realization the sum of $298.63. The amount is itemized as follows:

Sale of plants	$ 183.08
Sale of seed	108.20
Sale of dead wood on government land, Tantalus Forest	4.00
Receipts for fumigating plants (Division of Entomology)	3.35
	$ 298.63

EXPERIMENTAL WORK AT THE NURSERY.

The experimental work done at the Nursery has been along the lines of seed testing and the propagation of new and rare plants. In this connection the new testing house has been of much benefit to us. During heavy rains, outside propagation of some of the smaller seed, such as most of the Eucalypts, suffers greatly, as the seed are often washed out of the boxes and lost.

BLUEFIELDS BANANA PLANTS.

The Bluefields banana plants, which the Board turned over to the U. S. Experiment Station in 1905 for propagation, had, by the spring of 1906, produced enough young plants to supply those who had agreed to plant and report on the same. During the month of May, Mr. Jared G. Smith turned over to this Division for shipment, plants sufficient for fifty applicants. The plants were forwarded to people in different parts of Oahu, Hawaii, Kauai and Maui.

EXPERIMENTS WITH RUBBER.

During the month of May circular letters were sent to a number of selected persons on the different islands of the group asking them to coöperate with the Division of Forestry in making experiments in the growing of rubber trees. The circular letter stated that seed or plants would be supplied free providing they would agree to report occasionally on the growth and condition of the trees. It was proposed to make the experiments in the different districts from near sea level up to twenty-five hundred feet elevation and people were selected who had land at different elevations.

Ninety-four persons consented to coöperate with this Division and agreement postal cards stating the conditions were mailed to each to fill up. These were in due time returned to this office, filled out as required. To each applicant were sent twenty-five seeds of Ceara rubber *(Manihot glaziovii)*, filed and ready to plant, with instructions on the propagating and planting of same. The following is the number, by Islands, of persons who agreed to coöperate: Oahu, 20; Hawaii, 39; Maui, 17; Kauai, 10, and Molokai, 8. Favorable reports have already been received from a number of those who received seed. By these experiments it is believed that in time valuable data will be obtained showing the locations where this class of rubber may be successfully grown.

Four thousand seeds of the Central American Rubber *(Castilla lactiflua)* were received from Ceylon, being ordered through Mr. Jared G. Smith of the U. S. Experiment Station. A large percentage of the seed was useless when it arrived. From this consignment two hundred and forty-six plants were successfully propagated and are doing well. The 4,000 seed cost $68.32, and customs duties of $20.50, making a total of $88.82.

On August 6, the Nahiku Rubber Company received a consignment of Para Rubber *(Hevea brasiliensis)* stumps from Ceylon, but owing to the very bad condition of the plants on their arrival at Honolulu, the company concluded not to accept them. Consequently the plants were offered for sale on August 15 by the Custom House officials. Mr. Alexander Craw bought the plants for the Board and turned them over to the Nursery. The plants were planted in boxes and in a short time a number of them started to sprout. Eighty have already been potted off and are doing well. From twenty to thirty more show signs of life and we are in hopes of being able to save them.

Three consignments of seed of the Central American Rubber *(Castilla lactiflua)*, ordered from Mexico by Mr. G. R. Ewart were handed to us to be propagated for him.

Out of the first and last consignments only about one dozen of the seeds sprouted. Out of the second consignment 238 sprouted and those are doing well.

The total number of Castilla plants at the Nursery belonging to Mr. Ewart is 250; these we have been asked to distribute for him to the different sugar plantations on the Islands.

The rubber trees planted during 1905 in the Huluamanu gulch, at Moanalua, of which mention was made in the last annual report, are doing well. These trees may in time be looked to for both seed and cuttings.

NURSERY GROUNDS.

The nursery grounds have been kept in order by one regular laborer, with the assistance of two prisoners kindly granted by Sheriff Henry.

Among the improvements made during the year may be mentioned the making of a new driveway from King street to the stables, running along the east side of the office building. The drive has been graded and macadamized with coral rock. Considerable leveling and filling up with the same material has also been done around the stables. A new seed room has been created by enclosing one end of the wagon shed. All the out houses have been treated to a coat of green stain. An Hibiscus hedge has been planted on the division line between the Hotel Melrose and the Nursery grounds; the same is growing nicely and is from four to six feet high. Other general improvements have been the fixing up of side-walks and the leveling and grassing over of parts of the grounds that required attention.

ADVICE AND ASSISTANCE.

This work has taken up much of the writer's time during the past year.

In accordance with the offer made in Circular No. 1 of the Division of Forestry, applications for advice and assistance have been received from a number of people on the islands of Oahu, Hawaii and Maui. In answer thereto three trips have been made to Hawaii. two to Maui and three to places on Oahu, outside of the District of Honolulu. Twenty places have been visited in and around the city in answer to applications for advice and assistance in a number of matters connected with the growing and care of plants.

The following is a list of the places visited and the nature of the advice and assistance given to those outside of the District of Honolulu.

HAWAII.

Paauhau Plantation.

The making of a working plan for 65 acres of forest consisting principally of Blue Gum *(Eucalyptus globulus)* planted sixteen years ago. The plan was made on the basis of a twenty years' rotation crop, with a diagram showing the method of thinning recommended. Advice on a tract of land along the beach containing about 50 acres was also given. The object of planting trees on this tract was principally to protect the sugar cane from the heavy winds and salt spray; also for the wood. Ironwood *(Casuarina equisetifolia)* was recommended for this tract, the same to be planted six by six feet each way.

Parker Ranch.

An examination of the tree planting done by the Parker Ranch Company, with suggestions on the ground.

Honomu Plantation.

Examination and advice on patches of land along the gulches and a strip of land along the sea beach. For the patches along the gulches, Black Wattle *(Acacia decurrens)* was recommended, the same to be planted eight by eight feet each way. For the strip along the beach Ironwood *(Casuarina equisetifolia),* the same to be planted six by six feet each way.

Pepeekeo Plantation.

Examination with advice on certain lands belonging to the Pepeekeo Plantation Company. The following lands were examined: A strip of land along the sea beach, patches along the gulches, also a strip of land along the top of the cane fields.

For the land along the sea beach, Ironwood *(Casuarina equisetifolia)* was recommended, the same to be planted six by six feet each way. The patches along the gulches, Black Wattle *(Acacia decurrens)* to be planted eight by eight feet each way. For the strip of land along the top of the cane lands, Eucalyptus, preferably *E. citriodora, E. globulus* and *E. robusta,* to be planted six by six feet each way.

Wainaku Plantation.

Examination and report on a tract of land belonging to the Hilo Sugar Company and known as Punahoa first and second.

For this tract the planting of the Black Wattle *(Acacia decurrens)* was recommended, the same to be planted eight by eight feet each way. The land is admirably adapted for such purpose.

Pahala Plantation.

Examination with report and recommendations on the reforesting of certain lands belonging to the Hawaiian Agricultural Company at Pahala.

Examination of lands along the following gulches: Charley Wall gulch, Hionamoana, Clover and Whitney gulches, also a strip of land between the top of the cane land and the forest reserve boundary. For the gulches, the Black Wattle *(Acacia decurrens)* to be planted eight by eight feet each way. For the strip of land between the top of the cane land and the forets reserve boundary, principally Swamp Mahogany (*Eucalyptus robusta*), Lemon gum *(Eucalyptus citriodora)* and Red Gum tree of Southwestern Australia *(Eucalyptus calophylla)*.

Kukaiau Plantation.

Examination of certain government lands in the District of Hamakua, formerly leased to the Kukaiau Plantation Company, with recommendations in regard to tree planting thereon. The object of the visit to Kukaiau was for the purpose of examining and reporting on the present condition of the different tracts which the company has held under lease from the Government, also to submit some system of tree planting for the future, whereby the lands might be improved in addition to the annual revenue received by the Government should the land be again leased for grazing purposes. The following lands were examined: The part of Kaohe 2, known as "The Burned District," the tract known as the "Old Kukaiau Plantation Lease," also the Kaohe Forest Tract.

Recommendations.

Burned District, Kaohe 2, area 1,200 acres. If again leased for grazing purposes it is recommended that a tree planting clause be added, whereby the lessee will agree to plant and care for trees to the number of not less than 40 per acre, the same to be left in a growing and healthy condition at expiration of lease.

Old Kukaiau Plantation Lease. The part of the above tract examined and reported on is from an elevation of 2,900 feet on lower boundary up to 4,500 feet elevation. This covers an area of not less than 11,000 acres and is what might be termed "second class forest and grazing land." The same agreement is recommended for this tract as for Kaohe 2. With the trees now on the tract and the addition of 40 more per acre, quite a decent forest will be in progress at the end of the lease.

Kaohe Forest Tract. The above tract has been used for grazing purposes for the past twenty-five years and the writer is of the opinion that no better use can be made of it. There are plenty of trees on the tract and they are in a healthy condition.

Mooheau Park, Hilo.

Examination of trees supplied by this Division and planted on the first Arbor Day, November 3, 1905, at Mooheau Park, Hilo. The writer found most of the trees in a growing and healthy condition. This park is a great addition to the city and the people of Hilo have every reason to be proud of it.

Naalehu Plantation and Kapapala Ranch.

While in the Kau District, although no applications had been received, Kapapala Ranch and Naalehu Plantation were visited. The visit to Naalehu was principally for the purpose of examining the trees planted by the writer some sixteen years ago. At that time a great variety of trees was experimented with. A number of them are still to be found around the manager's house and several acres above the mill, but the large majority have perished. The principal trees left are the Blue gum *(Eucalyptus globulus),* Monterey Cypress and the Chinese plum (*Eugenia* sps.). The long droughts and cattle are responsible for the destruction of the large majority of the trees planted at that time.

Kapapala Ranch. One day was profitably spent at Kapapala Ranch, Mr. and Mrs. Monsarrat are both lovers of plants and their beautiful garden contains many rare and useful species seldom found anywhere else on the Islands. A grove of Eucalyptus, principally *E. calophylla,* was examined, also the nursery where a number of varieties of young plants were found in different stages of development. These plants were from seed sent from this Division.

Kukuihaele Plantation.

The visit to Kukuihaele was made for the purpose of collecting information regarding trees planted by Mr. D. Forbes a number of years ago, also to obtain information regarding the uses and value of Hawaiian grown timbers, which Mr. Forbes had been experimenting with and was using for a number of purposes on the plantation.

MAUI.

Wailuku Plantation.

Report with recommendations on the reforesting of certain lands on the Waikapu, Wailuku and Waihee sections of the Wailuku Plantation.

An examination of the different lands was made and the following recommendations submitted for the different tracts.

Waikapu Section: For the portion under 500 feet elevation, the planting of Algaroba *(Prosopis juliflora)*, and for the portion above the 500 feet level, Swamp Mahogany *(Eucalyptus robusta)*.

Wailuku Section: The preservation of the water is the principal object for this section. The following trees are recommended: For the tops of the barren ridges, Swamp Mahogany *(Eucalyptus robusta)*, Lemon gum *(Eucalyptus citriodora)*, Blue gum *(Eucalyptus globulus)* and species of Casuarina, including *Casuarina quadrivalvis*. For the sides and sheltered places, Silk Oak (*Grevillea robusta*), Japan Cedar (*Cryptomeria japonica*), Australian Black Wood (*Acacia melanoxylon*), Koa (*Acacia koa*) and a few others.

Waihee Beach Tract: The Ironwood *(Casuarina equisetifolia)* is recommended for this tract, but the Hala *(Pandanus odoratissima)*, Milo *(Thespesia populnea)*, Kamani *(Calophyllum inophyllum)* and *Barringtonia speciosa* might also be grown successfully. A line of each along the sea shore is recommended.

Polipoli Water Reservation, Kula.

This tract of land is 673 acres in extent and lies between the elevations of 5,000 feet and 6,250 feet above sea level. The object of reforesting this tract is to protect and, if possible, to increase the water supply of Polipoli and other smaller springs. It is essential that fast growing trees be planted for the first crop so that a water shed may be established as soon as possible. Swamp Mahogany *(Eucalyptus robusta)* is recommended as the predominating tree, but a few Lemon gum *(E. citriodora)*, Red Gum *(Eucalyptus rostrata)*. The Red gum of Southwestern Australia *(Eucalyptus calophylla)* might also be planted, the spacing to be six by six feet each way.

Wailuku Improvement Association.

At Wailuku the trees planted by the Wailuku Improvement Association, at the instance of the Hon. W. J. Coelho, were examined. The writer was very much pleased to see that the trees which had been sent from the Government Nursery from time to time had been made such good use of. Much praise is due Mr. Coelho and other members of the Association for the great interest they are taking in beautifying their streets and highways.

Lahainaluna School.

Examination of the grounds and certain lands belonging to the Lahainaluna school, with report and recommendations in regard to tree planting, etc. The following tracts were examined and reported on: The grounds, area about eight or nine acres, upon which the school buildings, dormitories, principal's house and work shop, etc., are erected; a piece of land within the grounds and to the north of the main school buildings; also the mountain tract, an area of about 1,000 acres. The lower end of this tract commences at an elevation of about 700 feet tbove sea level and runs up to the top of the mountain.

Recommendations.

School Grounds: Several suggestions were made verbally to Mr. C. A. MacDonald and Mr. C. Flack in regard to the planting and laying out of the grounds. These will be acted on as soon as time and plants are available.

Land to the North of the School Buildings. The piece of land is about one and a half acres in extent and is suitable for the growing of citrus and other fruits. A windbreak consisting of three rows of Black Wattle (*Acacia decurrens*) to be planted six by six feet each way to run along the north and east side should be the first work; then the planting of lime trees, the same to be planted twenty-five by twenty-five feet each way.

Mountain Tract: For the mountain tract the following trees are recommended: For the land under 1,500 feet elevation Black Wattle (*Acacia decurrens*), to be planted eight by eight feet each way; above 1,500 foot level and up to the top of the mountain, *Eucalyptus robusta, Eucalyptus citriodora, Eucalyptus calophylla, Acacia melanoxylon* and *Cupressus macrocarpa* for the most exposed places. For the more sheltered places *Cryptomeria japonica, Grevillea robusta* and *Acacia koa.*

Haiku Ranch.

At Haiku Ranch the trees planted by the company a number of years ago were examined. A great deal of tree planting has been done on this ranch with excellent success. Mr. David Fleming, the present manager, is very much interested in the forestry movement and contemplates planting large numbers of the best timber trees in the near future.

OAHU.

Honouliuli Ranch.

Examination of the trees planted by the ranch company with advice on the selection and planting of trees for the future. The Honouliuli Ranch Company, by its manager, Mr. H. M. von Holt, has done a great deal during the past few years towards the preservation and extension of the forest area. Large tracts of land along the tops of the gulches have been fenced off and the cattle driven out, with the result that the growth of a large number of young koas and other indigenous trees has been encouraged. A large number of different kinds of exotic trees has also been planted on this ranch during the last few years with good success. This work deserves the highest praise, for very seldom indeed do we find trees planted and cared for in the manner that they are to be found on this ranch.

Waianae-kai Forest Reserve.

Report with recommendations on the reforesting of the tract of land known as the "Waianae-kai Forest Reserve." This tract takes in all of the upper part of the Waianae Valley and has an area of 3,257 acres, more or less. The tract is mostly government land, the greater part of which is covered with indigenous trees and other vegetation. This is the water shed for the Waianae Company, who control all the land in this valley makai of the reserve. Most of the land owned by the company is planted in sugar cane. With the permission of the Board of Agriculture and Forestry, it is the desire of the Waianae Plantation Company to commence immediately to drive out all the cattle and fence the tract. The starting of a nursery and the planting out of forest trees on this reserve will also be undertaken by the company.

Recommendations.

For the part of the reserve under 600 feet elevation above sea level, the planting of Algaroba *(Prosopis juliflora)* is recommended. For the part of the reserve above the 600 foot level, a variety of trees is recommended as follows:

For the tops of the ridges and other exposed places: *Eucalyptus citriodora, E. globulus, E. robusta, Acacia melanoxylon, Casuarina quadrivalvis, Cupressus macrocarpa* and probably a few others which may be selected later.

For the flat land, also the sides and bottoms of gulches, *Cryptomeria japonica, Grevillea robusta, E. robusta, E. rostrata, E. calophylla* and *Acacia koa.*

Ii Estate Land.

Examination with advice on the planting of trees on the land of Waipio, in the Ewa District, belonging to the John Ii Estate.

The tract of land upon which advice was asked is the top of sub-gulch to the east and close by the mountain house.

The planting of *Eucalyptus robusta* was recommended for the most exposed places. For the more sheltered places *Cupressus macrocarpa, Cryptomeria japonica, Grevillea robusta, Acacia koa, Acacia melanoxylon* and probably a few others which may be selected later.

SUMMARY.

The foregoing statement includes all the large places visited and shows the nature of the advice given to those outside of the district of Honolulu. Of the nineteen places visited planting plans or detailed letters of advice were prepared and sent in eleven cases. For the other eight suggestions were made verbally at the time of the visit.

The assistance given to those in and around the city, as previously mentioned, in most cases had to do with matters connected with the growing and care of plants. The applications for this local work were often made over the telephone or in person. In addition much information on various subjects has been given to persons who have called at the Nursery.

For further information regarding descriptions or recommendations, etc., of any or all of the places mentioned where advice and assistance was given, the writer would refer to reports, plans, etc., drawn up at the time of the visits. These are on file in the office of the Division of Forestry.

Seed has been supplied from the Government Nursery to all those for whom working plans were made. The writer takes pleasure in stating that the majority have commenced to establish nurseries and are making preparations to plant in accordance with the plans and recommendations made.

Press Bulletin.

Press Bulletin No. 4 of the Division of Forestry, entitled "Instructions for Propagating and Planting Forest Trees," which was issued during the year, has been given to all requesting advice and assistance on the above subject.

Acknowledgment.

Before leaving the subject of advice and assistance the writer would like to state that he was everywhere very cordially received and that every assistance was given him in the way of transportation, the pointing out of lands and all other desired information. For these and other courtesies received, the writer avails himself of this opportunity of expressing his thanks.

REPORT OF THE DEPUTY FIRE WARDEN.

On March 22, 1906, the writer was appointed Deputy Fire Warden at Large for the Territory. During the period covered by this report several small fires have occurred in the neighborhood of Honolulu at each of which (excepting the Country Club fire) the writer was present.

On February 13, a fire was reported on Tantalus. The writer with three men from the Nursery went to where the smoke was seen and found a Japanese employed by Mr. T. Clive Davies burning several large piles of grass on the latter"s lot. The fire was watched till all danger of its spreading was over. On our way back, when near the Forester's cottage, we met a gang of men from the road department, who returned to the city on being told that the fire was out.

On the evening of March 11, a fire was observed at Palolo Valley. The writer with eleven men from the road department and one from the nursery started for it. It was found that the fire had started on lot No. 16, and it was supposed that children playing with matches was the cause. After four hours of hard work this fire was put out about 11 o'clock. The area burned over was covered with grass and brush, the fire being put out before it reached the native forest. The area burned over was, approximately, eight or nine acres.

On March 30, a fire was reported in Nuuanu Valley. The writer with four men from the Nursery on being informed by telephone started at once to investigate. On arriving at the scene, it was found that the fire was in a dwelling house belonging to Mr. W. C. Kapulani.

On the evening of July 24, at about 6 o'clock, a fire was reported in Nuuanu Valley. The writer on receiving word started at once with one of the men from the Nursery. When we arrived at the fire, which was on the east side of the valley opposite the old Queen Emma place. we found that about one acre had already been burned. With the assistance of two men, who reside near by, the fire was put out about 9 o'clock. About four acres were burned over, consisting principally of guava, lantana and long grass, with a few Hau trees. No clue could be found regarding the person who started this fire.

The writer was on Maui when the fire occurred on the Country Club lands in Nuuanu Valley.

NUUANU FOREST STATION.

At the Nuuanu Station two men have been employed during the year, their principal work being in keeping the vine (Maile pilau) in check, clearing grass away from the small trees and doing other routine work.

The workmen's house has been painted inside and the outside given a coat of green stain.

CONDITION OF FOREST.

The forest is in a very healthy condition and the trees have made considerable growth during the past year. As years go by it becomes evident that the planting of trees in Nuuanu Valley is not such a great mistake as some predicted, while the operation of planting was going on. Instead of the land lying idle as it was before tree planting was started, there are now prospects of the Government realizing a revenue from it, when these trees arrive at maturity. The clothing of the slopes with trees also increases the value of the land as a watershed.

From a large number of the native trees that were threatened with being strangled by the "Maile pilau" the vines have been cleared away. There will be time for more of this kind of work during the coming year as the young trees are getting up and do not require so much attention.

TANTALUS FOREST.

The Tantalus forest is also in a healthy and growing condition and the percentage of dead trees has been less than for the past several years. Four cords of dead wood were taken from the forest during the year, the price received for the same being one dollar per cord on the stump. The fruit and other valuable exotic trees planted a number of years ago and mentioned in my last report have been kept clear of brush and vines.

On March 6 the Board authorized the employment of a Forest Ranger for the Tantalus Heights section, District of Kona, Island of Oahu, at a salary of $60.00 a month. David Kapihe was appointed to the position and has done excellent work. His principal work is to see that the forest fire laws are observed and to be on hand when people have brush or other material to burn. He has also done considerable work in clearing out trails when he was not engaged looking after brush fires.

Respectfully submitted,

DAVID HAUGHS,

Forest Nurseryman.

Reports of District Foresters.

Following the usage of former years the Superintendent of Forestry requested the several District Foresters to submit reports to be included in this publication. The replies received are given below:

LETTER FROM THE SUPERINTENDENT OF FORESTRY.

Honolulu, Oahu, November 22, 1906.

Dear Sir:—The law creating the Board of Agriculture and Forestry makes mandatory the preparation and publication of an annual report. Following the established custom I wish to include in the Report of the Division of Forestry for the calendar year 1906 a statement from each of the District Foresters dealing with one or all of the following subjects:

Present Extent of the Native Forest: A concise description of the present limits of the native forest in your district, for the purpose of comparison in future years.

Present Condition of the Forest: Notes on the present condition of the forest and injuries from any cause during the past year.

Private Forest Reserves: Have areas of privately owned forest land been set apart in your district as private forest reserves? Notes on the ownership, area, length of time reserved, whether or not the area is fenced, and remarks on the object and benefits of the reserve, are in order.

Tax Exemption of Forest Land: Under the law forest land that is fenced off and treated as a reserve may be exempted from taxation. Has this provision been taken advantage of in your district? If so, for what area and since when? Does the law work well in practice? If not, why?

Forest Planting: During the year considerable interest has been manifested in forest planting. Notes as to the area, kind and number of trees planted, type of plantation established, etc., in your district are in order.

Forestry in General: Notes of interest on any forest matters.

As it is desired to have the report ready for distribution early in February, contributions should be in my hands not later than Christmas week.

Very sincerely yours,

Ralph S. Hosmer,

Superintendent of Forestry.

REPORT OF MR. A. S. WILCOX.

Halelea, Kauai.

Lihue, Kauai, Nov. 30, 1906.

Dear Sir:—Your favor of 22nd instant is at hand, and has had my careful consideration. I regret exceedingly that I am not in possession of sufficient information to make an exhaustive report.

Present Extent of the Native Forest: So far as I am aware, no accurate survey has been made of the District, and guesses would not be of any particular value.

Present Condition of the Forest: The present condition of the forest is excellent. There have been no forest fires, nor any damage by cattle worth mentioning.

Private Forest Reserves: Practically half of the land of Kalihiwai has been a Private Forest Reserve for a great many years. The growth is very dense, and this fact in connection with other conditions has rendered fencing unnecessary. The area I should estimate roughly at four thousand acres. The land is owned by myself, and it is my present intention to protect the forest as much as possible, to conserve the water supply.

Tax Exemption of Forest Land: No advantage has been taken of this provision, consequently I am unable to say whether the law would work well in practice or not.

Forest Planting: Nothing has been done in this line, as it has not been considered necessary. The district is very sparsely settled, and there is very little demand for firewood, which can easily be obtained without going to the mountains; the absence of fires, the small number of cattle, confined mainly to the makai lands on account of the impenetrable mass of undergrowth in the woods, the abundant rainfall, all tend to make planting scarcely worthy of consideration.

Yours very truly,

A. S. Wilcox.

REPORT OF MR. F. SCOTT.

Koolau, Kauai.

Kilauea, Kauai, H. T., Dec. 28, 1906.

Dear Sir:—Your letter of the 22nd ultimo, re Report of the Division of Forestry, to hand and in reply to your various subjects would state as follows:

Present Extent of the Native Forest: I am not able to give the limits of the native forest as there are no defined lines at present.

Present Condition of the Forest: The forest is in good condition and there have been no injuries from any cause during the past year, as I have driven out all cattle from the forest.

Forest Planting: There has been no planting done for the past year.

Respectfully yours,

F. Scott.

REPORT OF REV. J. M. LYDGATE.

East Kona, Kauai.

Lihue, Kauai, Dec. 28, 1906.

Dear Sir:—In response to your request I beg to hand you the following notes in regard to forest in my District of Koloa.

Present Extent of Native Forest: This is practically all contained within the bounds, surveys of which are now being prepared for you. This is a part of the Waialeale Range of Mountains. The Haupu Range retains little or no forest, what there is being of a scrubby and unimportant character. This region, however, in my opinion, ought to be set apart as a reserve and might support an interesting and valuable forest growth, the more so as it is easily accessible.

Condition of Forest: Except on the outskirts where the forest is exposed to destructive influences, it is, so far as my observations go, in a healthy and normal condition. There have been no fires or other devastating injuries during the year in this district.

Private Forest Reserves: Practically all the forest land in my district, as you know, is privately owned, controlled by the two sugar estates—the Koloa Plantation and the McBryde Sugar Co. The McBryde area, about two-thirds of the whole, has already been substantially fenced and arrangements are being made to fence the Koloa Plantation area.

Tax Exemption: Advantage has not been taken of this provision. I fancy for the reason that the amount of the tax remitted would be trifling and would cut no figure in the taxes of a large estate which, in any case, is taxed on a valuation as a whole.

In General: Whatever may be thought of lantana as a competitor and possibly a destructive agent for the forest, my observation has led me to believe that it is a valuable agent on the outskirts of the forest where its dense growth protects and perhaps rallies the retreating line of the forest, and in such regions it, to a considerable extent, serves the beneficial purposes of the original forest.

I had occasion recently to inspect a burned over sub-forest area at Wainiha and was pleased to note a generous and healthy young growth of Koa and Sandalwood coming up, so that under favorable conditions there will probably be a better forest showing there than before the fire. The dense coating of undergrowth had not given the forest a chance.

In conclusion I can only add my emphatic conviction that the forest areas should all be fenced as soon as possible.

Respectfully yours,

J. M. LYDGATE.

REPORT OF MR. WALTER D. McBRYDE.

East Kona, Kauai.

Brydeswood, Kauai, Dec. 5, 1906.

Sir:—I beg to acknowledge yours of Nov. 22, relative to a report on the forest conditions and forest work accomplished in this district.

Forest Reserve: The private forest reserves fenced off with a strong five-wire fence, all cattle excluded, set aside by the McBryde Sugar Company, as also the government forest reserve of Kalaheo, are showing marked effects from the exclusion of the cattle; the uluhi fern, as also other ferns, are growing rapidly over trails and covering bare spots, and young maile is growing abundantly where two years ago hardly any was to be found. I do not notice as yet, the growth of any young trees, but this is hardly expected in the short time the fence has been completed. It would, I think, be advisable to plant out within the forest reserve such foreign trees as the *Grevillea robusta* and the Eucalyptus, for these are known to reseed themselves on the slopes of Haleakala as also in other forests on this island.

Fires: Fortunately, I am able to report no forest fires within the last exceptionally dry year.

Tree Planting: The McBryde Sugar Company have done a great deal of tree planting during the year, putting out thousands of trees along their cane fields in the line of windbreaks and also planting in the gullies for the purpose of future firewood and posts.

The Koloa Sugar Company are also actively engaged in the reforesting of their lands denuded of forests through fire and the depredations of cattle. The work now being undertaken will speak for itself in a few years.

Within the past three years I have, with the aid of the McBryde family, entered enthusiastically into the reforesting of the lands adjoining the homestead and have, within that period, put out thirty thousand trees. Of this number I should say, fully 10 per cent. are fruit trees, viz.: mangoes, pears, oranges, peaches, etc.

I am more than pleased with the growth of the different Eucalypts which I have set out. I am now experimenting with some thirty varieties.

I am glad to report that I have been able to furnish free, from my nursery, to settlers and others some thousands of young trees of different varieties.

Very respectfully,

W. D. McBryde.

REPORT OF MR. FRANCIS GAY.

West Kona, Kauai.

Makaweli, Kauai, Dec. 3rd, 1906.

Sir:—In reply to yours of the 22nd ult. I beg to report as follows:

Present Extent of the Native Forest: Has not been surveyed, but is all covered with native woods.

Present Condition of the Forest: In good condition.

Private Forest Reserves: Gay & Robinson have for many years past set apart all their mountain lands and wherever necessary fenced.

Tax Exemption of Forest Land: Gay & Robinson have never claimed exemption.

Forest Planting: It has not been necessary to plant the mountain lands, but on the low lands. forests were started by the land owners in the district, mostly by V. Knudsen and Gay & Robinson.

Forestry in General: No forest fires occurred this year, but small grass fires. that didn't do much harm.

Yours very truly,

Francis Gay.

REPORT OF MR. AUGUSTUS F. KNUDSEN.

Napali, Kauai.

Kekaha, Kauai, Dec. 7, 1906.

This section consists of that part of the Waimea District lying west and north of the Waimea and Poomau canons and the district of Napali.

All the upland is well forested, while the cliffs and sides of the canons have been stripped of all verdure by the goats.

The whole of the Mana and Kekaha water shed is a semi-arid region. More or less compact clumps of trees or groves exist at the heads of the Mana gulches. These are Koa on the ridges and mostly Kukui in the gulches. There are also several groves of Lehua, some of them very fine though of small area. None of these exceed one acre in extent, but follow in frequent succession a belt of country from one to two miles wide between the 2000 and the 3000 foot contour line. This extends from the escarpment of the Waimea pali on the south to the Kauhau gulch on the north. This is the boundary of the private forest reserve. Within the forest reserve is an almost continuous forest; the only denudation is along the pali where the wild goats are doing and have done a great deal of damage. From the Kauhau gulch to Kalalau there is hardly a tree left on the bluffs. From the south buttress of Kalalau, called Nianiau, northwards the goats are making slower progress on account of the greater monthly precipitation. But gradually the forest is receding, the turf and soil is being trampled and washed off, and the bare rock remains grim and forbidding.

Present Condition: South of the forest boundary fence running from Kauhau pali to Puu Hinahina is grazing land and naturally there is no new or young growth, but this is outside of any forest in its true sense, and is a dry section in which no rivers originate. Within the reserve the forest has grown more dense and has not suffered any injury except as far as the goats are concerned.

Private Forest Reserves: The Knudsen Estate protected the high upland forest by continual and relentless hunting of the wild cattle and goats as early as 1882. By 1890 the wild cattle were practically extinct, not only on the lands controlled by the Estate, but on the adjacent parts of Napali. In 1898 the firm of Knudsen Bros. built a fence at a convenient location to prevent their cattle from encroaching on the great forest. This is the fence mentioned above and protects an immense area variously estimated at from eighteen to thirty thousand acres. This forest covers the headwaters of the Milolii, Nuulolo, Awaapuhi rivers and parts of the drainage areas of Kalalau and Waimea rivers.

Tax Exemption: No advantage has been taken so far of this provision in the law relating to forest reserves.

Forest Planting: Nothing of any great extent has been attempted in this section. Mr. A. F. Knudsen has made sundry attempts with many varieties to find a forest tree easy of propagation that would not need care or irrigation. So far *Acacia melanoxylon,* the Australian Koa, has been the most satisfactory. The seed was planted in open spaces in the forest, amid grass and bracken, by merely scratching the ground every few feet and putting in the seed. There is now quite a stand of trees two to six feet tall, at practically no expense. Some will grow even if the seed is merely broadcast on the ground. A New Zealand tree known as the Karaka has begun to spread voluntarily from two original trees planted at Halemanu by Mr. V. Knudsen about 1880. This spreading has been assisted by carrying the seed and scattering them far and wide. It makes an excellent secondary growth and makes a dense shade. Cattle eat the leaves with avidity. Of late years the most marked forest growth has been seen in the great number of Kauila (Ironwood) trees springing up in all directions within the fenced area, and the seedling Koa trees starting up as soon as the dying parent tree drops its leaves, thus letting in the sunshine to start the waiting germ into life. These two trees promise to regenerate the forests in the vicinity of Halemanu.

Forest Fires: One forest fire occurred within the forest area during the year. It occurred about August 12th, and burned over an area of about four acres. It was open grass and fern country with a few scattered trees. The fire originated in a burning stump that was thought to have been carefully extinguished.

No loss was sustained. Back firing from roads and trails to leeward and beating on the windward side quickly extinguished it. Six men from neighboring camps, with several women and children, put the fire out with no expense financially.

AUGUSTUS F. KNUDSEN.

REPORT OF MR. JOHN HERD.

Koolaupoko, Oahu.

Maunawili Ranch, Waimanalo, Oahu, Dec. 24, 1906.

Dear Sir:—In compliance with your request, I herewith submit my annual report on forest conditions:

Present Extent of Native Forest: The forest in this section is confined to a very narrow strip, running along the base of a portion of the Koolau Mountain Range. As the mountain wall rises very abruptly, the strip referred to varies considerably in width and is much interrupted by the numerous gulches and ravines running through the same.

Present Condition: The limited and interrupted area of forest above noted is mostly made up of Kukui and Ohia with occasional Koa trees, and its condition has not changed very materially since my last report was submitted. It has been noticeable, however, that many of the Ohia ai (Mountain Apple) trees in the gulches continue producing much dead growth from the top of tree and that the Koa twig and seed worms are still in evidence.

Re-Forestation: W. G. Irwin, the owner of all the area within the confines of the Maunawili Ranch, is the only person who has so far gone to any trouble or expense in either protecting or reforesting the section under my control as District Forester. On the Maunawili Ranch, Mr. Irwin has established and planted eight (8) separate and permanent reserves consisting of about 300 acres. These reserves are all fenced in, the object being to protect the adjoining native forest above referred to.

Number and Variety of Trees Planted: During the past year, there have been planted out on the ranch above named 3,133 trees of the following varieties: Alligator pear, mango, kamani, milo, koa, *Albizzia moluccana, Grevillea robusta,* mahogany, jacaranda, mammea apple, traveller's tree, bouganvillea, banyan, longan, *Castilloa elastica, Manihot glaziovii,* cocoanut, magnolia, cryptomeria, araucaria and Bluefield bananas.

Forestry in General: The past season was an exceptionally dry one, which fact prevented the planting out of any large number of trees. Advantage of the dry weather was taken, however, by clearing around trees of former plantings.

Respectfully submitted,

John Herd,
District Forester.

REPORT OF MR. A. M. NOWELL.

Waialua, Oahu.

Wahiawa, Oahu, Dec. 27, 1906.

Dear Sir:—I am in receipt of your letter of November 22nd, asking for my contribution to the annual report of the Board of Agriculture and Forestry, for the year 1906, the same to be dealt with on the following lines:

Present Extent of the Native Forest: A concise description of the present limits of the native forest in this district would necessitate more of a study than I have up to this time been able to give the matter, but it is with certainty that I can say that since the cattle have been excluded from the lower forest, the latter has been increasing steadily and surely.

Present Condition of the Forest: This forest is at present suffering but little from injuries of any kind, and is in a rather better condition now than at the same time last year, and this in spite of the fact that the twelve months just past, with the exception of the present month of December, have been very dry.

Private Forest Reserves: There has been, as yet, no area actually set apart in this district, as a Forest Reserve.

A reserve, of approximately 23,040 acres, has, however, been proposed, and considerable preliminary work done on the proposition, but the project is still pending.

Tax Exemption of Forest Land: There is an area of about 12,700 acres of Upper Kawailoa and Paalaa, that has been fenced off for a number of years, and practically treated as a Reserve, but I believe there has been no tax exemption on this land.

Forest Planting: There has been nothing done in this line here this year, but negotiations are under way with the manager of the Waialua Agricultural Co., Ltd., for the reforestation of certain lands of Kawailoa and Paalaa, between the elevations of 800 and 1,200 feet.

I believe this matter should be pushed, as the successful fulfillment of such an undertaking, would, in my opinion, be most beneficial in its results. There would be an increase in precipitation, which would be of distinct benefit to the whole district, and there would be a source of profit to the parties concerned.

Forest Fires: There have been but two fires in this district this year, and neither of these could be termed a *forest fire.*

On the third of March there occurred a grass fire, which, though put out before any damage was done, came very near to being a very disastrous one.

This was at Wahiawa, on the north side of the north fork of the Kaukonahua, and directly opposite to the scene of the disastrous fire of March, 1905, which, by the way, might lead one to suppose that both *March* and *Wahiawa* were synonymous with *fire.*

This fire burned about twenty-five acres of grass land, but in several places reached as far as the top of the Kaukonahua gulch, and succeeded in spreading down into the gulch, where it was with difficulty gotten under control before reaching the timber.

The mauka line of the burned area was less than two miles from the makai line of the heavy forest, and, with the tall rank grass as dry as it was at that time, had the fire obtained a trifle more start, the consequences might have been very severe.

This fire was put out by Waialua Agricultural Co. men, a luna and three Japanese laborers, who live near by. They responded promptly, and did their work thoroughly as well as rapidly, and had the fire out when I arrived.

This fire satisfied me conclusively that I should avail myself of the suggestion in your letter of February 23rd, to cause the issuance, under the Forest Fire Law (Act 71, Session Laws of 1905.) of a *Special Fire Warning.* I recommended that the area, bounded as follows, be thus guarded:

South—Waianae District line.

South and West—The Kaukonahua stream.

West and North—The Waialua Agricultural Co.'s ditch, from the Wahiawa Dam, and an extension of same, following approximately the 700-foot contour, to the Waimea boundary.

North and East—The Waialua-Koolauloa District line.

This recommendation was approved, and the area described became the object of a Special Fire Warning, for a period of six months from March 7th, 1906.

I would say that during this period I was not called upon to issue a single permit for starting fires, but I have not the least doubt that, had there been no warning during that dry time, I should have had numerous fires to deal with. This, to my mind, goes to show that the customary fires, occurring during dry weather, are not necessary ones or ones that could have taken place legitimately by the application for a permit, but were fires that start through the carelessness and neglect of cattle men, hunters, and very possibly charcoal-burners.

The second and last fire this year, occurred on August 2nd, also at Wahiawa, and on the same ridge as the above mentioned one, only a little further makai.

About two acres of grass land was burned, the fire being put out by the same men that put out fire No. 1, and no damage was done.

Rainfall: It may be interesting to follow the record of rainfall, that I started in my last year's report, so I shall repeat, adding the new record for this year. The following figures are for an elevation of thirty feet:

1901..........	35 inches.	1904..........	66 inches.
1902..........	27 "	1905..........	18 "
1903..........	16 "	1906..........	27 "

This makes an average annual fall of 32 inches. As stated last year, the rainfall five miles inland, at an elevation of 1,000 feet, is double that at thirty feet, while the fall ten miles inland is approximately four times that at 30 feet.

In conclusion, I would say that I hope the year 1907 will see the establishment of the Waialua Forest Reserve, the accomplishment of the reforestation work as outlined, and the fulfillment of any other plans for forest work that may be for the benefit of the district.

Respectfully submitted,

A. M. Nowell,
District Forester, Waialua District.

REPORT OF MR. JAMES MUNRO.

Molokai.

Kaunakakai, Molokai, Dec. 7th, 1906.

Dear Sir:—Yours of 22nd ult. to hand and contents noted. For most of the data required I will have to refer you to Mr. Chas. A. Hartwell.

In re amount of tree planting done up to date this is all I can fine record of: 12,450 Black Wattle (there must be very much more); 5,695 *Eucalyptus robusta* (more to plant); 3,655 White Locust (approximately; more to plant); 2,000 Japanese Sugi (approximately).

I will try and get some more data together on the amount of tree planting done and furnish you with it later.

No forest fires during the year.

Very truly,

James Munro.

REPORT OF MR. C. C. CONRADT.

East Molokai.

Pukoo, Molokai, Dec. 8th, 1906.

Dear Sir:—In reply to yours of November 22nd, asking for a report on forestry for the east end of the island of Molokai, I have to state that owing to the fact of my being a resident here of only a few months, I have not had the chance, nor time, to cover the ground from which to gather my information, as to the present extent of the native forest and present condition of the forest.

As to private forest reserves I know of none, although parties are contemplating the setting aside and also fencing for private forest reserves. As to forest planting I do not know of any one that has undertaken that in this district.

Respectfully yours,

C. C. CONRADT.

REPORT OF MR. L. BARKHAUSEN.

Lahaina, Maui.

Lahaina, Dec. 26th, 1906.

Dear Sir:—Your favor of the 22nd ult. to hand and contents noted. I am unable to give you the area of native forest land in this district. The forest land under control of the Pioneer Mill Co., Ltd., in an altitude from 2000 feet and higher has been fenced in for a number of years, and as far as I have been able to observe the forest is in a healthy condition.

The company has never yet taken advantage of the tax exemption clause for the simple reason that it did not know of the existence of such clause. There have been no forest fires in the district during the year.

Yours very respectfully,

L. BARKHAUSEN.

REPORT OF MR. C. B. WELLS.

Wailuku, Maui.

Wailuku, Maui, H. T., Dec. 19, 1906.

Dear Sir:—Your esteemed favor of Nov. 22nd to hand and I must apologize for not answering sooner.

Present Extent of Native Forest: I am unable to give. I have been waiting for some two years to go over the whole ground with you.

Present Condition of Forest: As far as I have been able to observe, it is in the same condition as last year.

Private Forest Reserves: There are none.

Forest Planting: None has been done. The Wailuku Sugar Company are planning to commence tree planting on quite a large scale and are only delayed by not having a competent man to attend to planting of seeds and looking after the trees when set out.

I regret I cannot give you a more satisfactory report and will again write you asking you to visit me at Wailuku and go over the ground with me. I am

Very truly yours,

C. B. WELLS,
Forester for District of Wailuku, Island of Maui.

REPORT OF DR. J. H. RAYMOND.

Kula, Honuaula and Kahikinui, Maui.

Wailuku, Maui, Dec. 8, 1906.

Dear Sir:—I herewith submit a brief report on the conditions appertaining to the forest in my district:

The forest belt in the District of Kula extends from an elevation of from approximately 3,000 feet to the top of the mountain, the thickest portion being at an elevation of about from 3,500 to 5,000 feet.

The lands from north to south along the slopes of Haleakala are as follows: Waiakoa, Kaonoulu, Waiohuli, Keokea, Kamaole and Ulupalakua. The mountain slopes from approximately 7,000 feet to about 4,000 feet, which would be the highest point above Ulupalakua. The forest, or what is left of a once densely covered land, is composed of straggling, dead and rapidly dying mamanis, ohias, koas and a variety of other native trees usually found on the mountain slopes. There still remain quite a number of healthy trees throughout the district above referred to, but unless something is done at once to protect them, within a comparatively short time, what are left will be destroyed.

The lands of Waiohuli and Keokea are under lease to the Cornwell Estate; said lease expires in 1911. The lands of Kamaole and Waiakea are government lands, the latter, the upper part of which constitutes in part the Polipoli Reservation, is at this time a forest reservation, containing 673 acres, and is maintained under an agreement with the Hawaiian Government by the Raymond Ranch as a forest reserve. This land is to be planted with a variety of trees, the seed of which have been furnished by the Department of Agriculture and Forestry of the Territory, and within a few weeks will be planted. It is proposed to plant principally the different variety of eucalyptus, on recommendation of Mr. David Haughs of the department. The desolated appearance of the lands above referred to, Waiakoa, Waiohuli and Keokea in particular, presents in itself the strongest argument in favor of action on the part of those interested toward saving to the island what was once and may be again a rich agricultural district. Immediately below these lands there are several hundred acres of agricultural land rented out to Chinese corn-planters. These lands for forty years have been very productive, it being said that that district, during the time of the visitation of the whaling vessels to these islands, furnished them with produce, most particularly Irish potatoes, and derived therefrom a good revenue.

It is now no longer necessary to dilate upon the advantages of the conservation of forests in that region, nor is it at all necessary to point out to you the advantages to the interests of the Territory at large of these agricultural lands; suffice to say that there are hundred of acres of choice Government land, both above and below the government road, that will support a large number of bona fide American settlers, and the writer believes everything should be done toward protecting the forest for the above reason. The lands above and below the corn-fields are used by the Cornwell Estate for pasturing cattle, and it is due to this that the forests have been destroyed.

The lands adjoining Kamaole, extending to the east, around to and including the southern part of the island are as follows: Ulupalakua, Kanaio, Auwahi and Kahikinui. All through Ulupalakua there are to be found a variety of beautiful, large eucalyptus trees, pines, wattles and many other varieties that were planted by the late Captain Makee. A more fitting and lasting monument could not possibly have been erected by him to commemorate his industry and unselfishness and desire to benefit those who were to follow him than the planting of this magnificent collection of trees. That they have had the desired effect upon the precipitation of moisture there can be no doubt, as ample proof is at hand of the great benefit in this respect, derived therefrom. While no definite plans have been made toward reserving any particular land at Ulupalakua for the purpose of planting trees, it is our intention to do much in this respect, more especially toward planting of fruit trees.

The land of Kanaio is in part owned by the Government and the Raymond Ranch, besides a large number of kuleanas. The upper part of the middle third is quite densely covered with mostly native shrubs and a number of native trees. It is at present not under lease.

The land of Auwahi extends on the southern slopes of Haleakala from the top of the mountain to the sea and is owned in fee simple by the Raymond Ranch. Upon the upper third of this land can be found a very well preserved forest of native trees; the greater portion of this area of forest land has been fenced off and is now maintained as a private forest reserve by the owners, approximately 1,200 acres. This land has been fenced and there are practically no cattle within the reserve.

The land of Kahikinui, also on the southern slopes of Haleakala running from the top of the mountain to the sea, contains about 25,000 acres and between the elevation of 3,000 feet and the top of the mountain can be seen the remnants of a once densely wooded land, more particularly the lower part of the upper third. The forest stretching across the entire slope of the mountain has been destroyed by the cattle and it is commonly known and referred to by the natives now living in that district. The forest consisted at one time, mostly of Mamane and Ohia trees and in various places there are to be found at this time a number of

Ohia trees scattered throughout the district, which, in some instances, have been fenced off by the Raymond Ranch.

In 1901, when I purchased the interest of Kahikinui, there were about 3,000 head of cattle running on that land and Auwahi, mostly on Kahikinui, the greater number of which were to be found on the upper third of these lands and were mostly wild. It was plainly seen that the best part of the entire ranch was in this particular region. Necessity compelled the fencing off of nearly one-half of the land in order that the wild cattle might be controlled, and accordingly I constructed, at my own expense, a five-wire fence extending across the entire slope of the mountain, running through the lower part of what was once the thickest part of the forest, and upon completion of said fence and since that time we have continually reduced the number of cattle on top of the mountain and I now observe the following effect. There has been a rapid growth of all of the native shrubs above the fence line and I note most particularly that from the fence line to the very top of the mountain there has been a rapid growth of young Mamani trees and from the manner in which these shrubs and trees have grown it would seem that it will be but a comparatively short time when the forest in that region will again be in evidence. The ill effect upon the Kahikinui lands, from loss of forests, as well as upon the adjoining land of Waiopai, controlled by the Haleakala Ranch Co., to the east of the Kahikinui lands, has been felt most particularly during our incumbency and is well known by every one who is familiar and has been familiar with those lands for many years past.

The most striking evidence of the effect of the conservation of forests can be noted in the difference of pasture lands between the Waiopai and Kahikinui lands and that of Auwahi, the land referred to as having its middle third reserved for forest purposes. During the past three years when the lands of Waiopai and Kahikinui were suffering from the most severe drought known in their history, Auwahi supported a large number of cattle and was visited by frequent showers, which the writer attributes solely to the influence of the forest growth.

From my experience with lands of Kahikinui during the past four years and considering the effect upon the productive capacity of the land for pastural purposes (admittedly the only use that this land can be put to by reason of its arid character) and from my observation as above referred to of the effect of removal of cattle from the upper forest region, it is imperative that some measure or measures must be adopted to save the lands, and it is the intention of the Raymond Ranch to formulate a plan whereby the upper part of these various lands, viz: Kanaio, Auwahi and Kahikinui, may be established as a permanent forest reserve and it is hoped and believed that when the said plan shall have been completed that the Government will lend its efforts to the project. It is the writer's belief that if such support is forth coming from the Government, that not only those particular lands may be saved but that the entire island of Maui will be benefited by the reforesting of the entire upper slopes of both sides of the mountain.

I remain, Yours very truly,

J. H. Raymond,
District Forester, Districts of Kula, Ulupalakua and Kahikinui.

REPORT OF MR. L. VON TEMPSKY.

Kula and Kaupo, Maui.

Makawao, Maui, T. H., Dec. 14, 1906.

Dear Sir:—In accordance with the wishes expressed in your letter of the 22nd ult. I append herewith a report of work done in this and the Kaupo District for the last year or so.

Present Extent of Native Forest: The Makawao Forest, a portion of which is in my district, extends from the Maliko Gulch, which runs down the mountain on the eastern side of Olinda, clear round the mountain in an easterly direction to Nahiku; running mauka to an elevation of *about* 6,500 feet—Puu o Luuau being on the upper edge of the forest—and makai to about 2,400 feet.

The present condition of this forest is good. On the Haleakala Ranch Co.'s side it is securely fenced and the fence kept in good order. The growth of young trees since the exclusion of cattle being very marked, these consist mainly of Ohia, Koa, Olapa, Naio, Pua and Mamani.

On the northern slope of Haleakala above the ordinary forest belt, and also in the Crater of Haleakala, the growth of young Mamani is something extraordinary. In some places, which formerly were open and clear, it is now next to impossible to get through on horseback; this in spite of the fact that there are just as many, if not more, cattle now than there used to be. This growth commenced about sixteen or eighteen years ago.

A great number of the old Koa trees are dead, or dying, from the effects of an insect which bores into the ends of the branches and later on kills the tree.

Private Forest Reserve: The Haleakala Ranch Co. has voluntarily fenced, and reserved, an area of over seven thousand acres of forest land; this land lies mauka of the Government Forest Reserve (Koolau), and the closing up of this land by the company, with a fence, has secured the government land from the depredations of cattle. The object of this reservation is to conserve the rainfall of the district.

The Haleakala Ranch Co. has not taken advantage of the law which allows of exemption of taxes on land reserved for forestry.

Forest Planting: The residents of the Makawao District have always been growers of trees, and the last year or two this industry has received a fresh impetus, due principally, I think, to the people seeing for themselves the amount of firewood that a grove of *Eucalyptus globulus* will produce in a few years' time. This is about the only tree the general public plant, I suppose from the fact that they are certain of its growing anywhere, and also that the seed can be had for the picking.

The Haleakala Ranch Co. has gone in systematically for the last seven years for planting and experimenting with trees and tree seeds, their object being, first, shade and shelter for cattle; later on, for the production of fence posts, railroad ties, firewood, etc., etc.; and incidentally, the general improvement in appearance of the company's property.

The general type of plantation established is an area varying from seven (7) to twenty-five (25) acres selected with a view to sheltering the young trees, and later on the cattle, from the prevailing N. E. trade winds and rain. The trees are planted from 8 feet by 8 feet to 15 feet by 15 feet apart, as conditions require; and are securely fenced off from stock.

Furrows are plowed out and then the tree holes are prepared by "kipikua" work. The trees selected for planting are generally *Eucalyptus globulus* to windward, they being quickest to grow, and rapidly forming a breakwind for the more delicate and slower growing kind.

From the appended list of seventy-six (76) varieties of trees experimented with, I have come down to planting principally the following:

For Shade.—*Acacia melanoxylon, Grevillea robusta, Eucalyptus globulus, Eucalyptus robusta, Cupressus macrocarpa.*

For Fence Posts.—*Eucalyptus leucoxylon, Eucalyptus corymbosa.*

For Railroad Ties.—*Eucalyptus rostrata, Eucalyptus corynocalyx.*

There have been planted on the ranch since 1899 over 120,000 trees, eighty per cent. of which are growing and doing well; these are planted out in twenty-three (23) lots, besides avenues, along fences, etc., etc., in all over 250 acres, ranging in elevation from 300 feet at Waiopai and 2000 feet at Makawao to 6500 feet.

At 300 feet Kiawe is the only tree I plant, but there are trees of this sort now growing in Kuia, at the 2500 feet altitude. I am selecting the seed from these trees and planting them still higher up. At what elevation they will cease to thrive remains for time to prove.

At the 6500 feet elevation I have planted the aforementioned nine varieties, also a number of pines; and strange to say, the pines are doing the least well of them all. Between 2000 feet and 6500 feet they all do well except that the *Acacia melanoxylon* is subject to the ravages of the so-called "Olinda beetle." If it were not for this set back, it would grow almost as rapidly as the rest of them.

The common Wattle that grows so successfully in the Kula District, I have found by experience to be the equal of, if not superior to, the Hawaiian Koa for ox yokes, brake-blocks for wagons, etc., etc. If dried carefully it does not warp or crack, and is very durable. There ought to be quite a future for this tree in Kula as it grows, seeds itself, and thrives in the face of all that cattle can do to destroy it. I have noticed it growing down on the plains, at as low an elevation as 500 feet, and from there to 4000 feet it grows equally well.

I should like to have identified a tree I noticed growing near Hilo, at the residence of Mr. W. H. C. Campbell, manager of the Hawaii Mill Co. I have heard it called German Spruce. Whatever it is, it certainly grows as well as any tree I have seen in the Islands, and it might have quite a large commercial value. I know that these trees (there are eight or nine of them) are not more than six years old, as I was there at that time, and they were not even planted then. I have tried some seed I secured at the time I was there (last April), but am afraid the trees are too young for the seed to germinate, as so far I have had no success.

I should think it would be well worth the trouble when any officer of the Forestry Department is in Hilo, to look them up and identify them. I would give a good deal to get them growing on the slopes of Haleakala.

Respectfully submitted,
L. VON TEMPSKY,
Manager Haleakala Ranch Co.

LIST OF TREES EXPERIMENTED WITH BY HALEAKALA RANCH COMPANY TO NOVEMBER 30, 1906.

Name.	Date Planted.	Remarks.
Ash	Jan., 1902	Grows well at 5500 ft. elevation.
Acacia Baileyana	May, 1902	Grows well; wonderful reseeder.
" Latifolia	Jan., 1905	Grows well.
" Melanoxylon	Jan., 1904	One of the best trees to plant.
" Pycnantha	Sept., 1906	Grows well.
" Lopantha	Sept., 1906	Grows well.
" Floribunda	Sept., 1906	Grows well.
Beech, purple	Jan., 1902	Grows well at 5500 ft. elevation.
Brachychiton Acerifolia	Sept., 1906	Grows well.
Catalpa Speciosa	Jan., 1902	Very slow of growth.

Name.	Date Planted.	Remarks.
Catalpa Bignonioides	Jan., 1902	Did not grow.
Cryptomeria Japonica	Jan., 1902	Did not grow.
Camphor	Jan., 1902	Very well at 2000 ft. great reseeder.
Cupressus Macrocarpa	Jan., 1899	Very good from 2000 to 5500 ft. el.
Casuarina	Jan., 1902	Very good at 2000 ft. elevation.
Eucalyptus Robusta	Sept., 1901	A 1 from 2000 to 5500 ft. elevation.
“ Citriodora	Sept., 1900	do.
“ Globulus	Jan., 1899	do
“ Rostrata	Jan., 1899	do
“ Ficifolia	Jan., 1899	Grows well 2000 to 4000 ft. el.
“ Salignae	Jan., 1903	Seed sterile.
“ Marginata	Jan., 1903	Seed sterile.
“ Cordosa	Jan., 1903	Seed sterile.
“ Cerbera	Jan., 1903	Does well.
“ Coriacea	Jan., 1903	do
“ Pillularis	Jan., 1903	do
“ McArthurii	Jan., 1903	do
“ Longifolia	Jan., 1903	do
“ Siderophólia	Jan., 1903	do
“ Dephanophylla	Oct., 1903	Seed no good.
“ Obliqua	Apr., 1904	do
“ Leucoxylon	Apr., 1905	Seed good, does well.
“ Corymbosa	Apr., 1905	do do
“ Corynocalyx	Apr., 1905	do do
“ Paniculata	Sept., 1906	Does well so far.
“ Amygdalina	Sept., 1906	do
“ Botryoides	Sept., 1906	do
“ Siberiana	Sept., 1906	do
“ Rudis	Sept., 1906	do
“ Marginata	Sept., 1906	do
Elm	Jan., 1902	Grows well but for “Olinda beetle”
European Larch	Jan., 1902	do do
German Spruce	May, 1906	Seed did not sprout.
Grevillea Robusta	Jan., 1901	Very good from 2000 to 4000 ft. el.
Ginko Biloba	Oct., 1902	Sprouted and died.
Kamane	Jan., 1905	Grew well.
Karaka	Aug., 1906	Grows well so far.
Locust, black	Jan., 1902	Grew well, Olinda beetles killed them.
" white	Jan., 1902	do do
Linden	Jan., 1902	Grows well but for Olinda beetle.
Maple, Norwegian	Jan., 1902	do do
“ Cutleaf	Jan., 1902	do do

Name.	Date Planted.	Remarks.
Milo	Apr., 1903	Does well makai.
Manele	July, 1906	Grows well.
Maiden Hair tree	May, 1902	2 seeds sprouted, did not thrive.
Pua	May, 1902	Did not grow.
Pinus Maritima	Jan., 1903	Good seed, trees did not thrive.
" Torreyana	Jan., 1903	do do
" Tuberculata	Jan., 1903	do do
" Ponderosa	Jan., 1903	do do
" Pinea	Jan., 1903	do do
" Attenuata	Dec., 1904	Seed sprouted, slow growth.
" Coulteri	Dec., 1904	do do
" Insignis	Dec., 1904	do grows well.
" Lambertiana	Dec., 1904	do do
Picea Macrocarpa	Dec., 1904	do slow growth.
Poplar, silver	Jan., 1902	Grows well.
Rubber Ceara	May, 1906	Slow growth.
Cork Oak	Mar. 29, 1902	Sprouted, but did not succeed.
Sequoia Gigantea	Jan., 1902	Growing well (one) but slowly.
" Sempervirens	Jan., 1903	Seed no good.
Tipuana Speciosa	May, 1902	Seed sterile.
Tulip Tree	Jan., 1902	Grows very well at 2000 ft. el.
Uhiuhi	July, 1906	do
Kiawe	Jan., 1899	do
Syncarpia Laurifolia	May, 1902	Did not grow.

REPORT OF MR. W. F. POGUE.

Koolau, Maui.

Kailua, Maui, January 24th, 1907.

Dear Sir:—Complying with your request for a report on the state of the Koolau and East Hamakualoa Forest Reserve, I would state: That the fence from Halehaku to Makapipi, erected two years ago, has been kept in repair, all stock have been excluded and with few exceptions, and then for only a day or two, no stock have been at large above the said fence.

The renewal of the forest in places where formerly there was only Hilo grass, is very marked in some localities; young Paihi, Ohia Lehua, Kopiko, Haa, Koa and other native forest trees are coming up very thick in places.

In spots at Honomanu, Keanae, Nahiku the Ieie is dying out, and many of the forest trees with it, the reason for which is not apparent.

There have been no forest fires since the erection of the so-called forest fence.

The residents living contiguous to this Forest Reserve are now reconciled to the exclusion of stock from above the forest fence, and, in not a few cases, are giving assistance in the preservation of the forest.

Respectfully submitted,

W. F. Pogue.

REPORT OF MR. T. S. KAY.

North Kohala, Hawaii.

Kohala, Hawaii, Dec. 31, 1906.

Dear Mr. Hosmer:—

I have your regarded favors of Nov. 22 before me. Regarding the information you call for about the forests in this district, I regret to say I cannot supply you with any information which you do not know, as I have made no investigations as to forest acreage.

There have been no forest fires during the past year in our district; there have been no additions to existing reserves.

Present reserves are in fine condition, becoming so dense that it is now impossible to get through the old trails; fences are in a fairly good condition, sufficient to prevent animals from doing any injury.

Private planting of trees in ravines and waste places has been carried on as usual.

A very fine, healthy belt of forest is now growing well along the sea coast in Halawa after many years of persistent effort, in all about 15 acres. Having had good success here, I would like to see the whole coast line planted up.

And as our effort is an object lesson, I hope in the near future to see others do this.

Believe me to remain,

Yours respectfully,

Thos. S. Kay.

REPORT OF MR. JOHN M. ROSS.

North Hilo, Hawaii.

Hakalau, Hawaii, T. H., 21st Dec., 1906.

Dear Sir:—In reply to yours of Nov. 22nd, requesting a statement from each of the District Foresters for your annual report, I will report as follows:

1. Present Extent of Native Forest: I would estimate the present limits of the native forest in my district to average six miles in depth by sixteen in length, or about 62,000 acres.

2. Present Condition of Forest: The forest condition is excellent, with a dense undergrowth of ferns, vines and shrubs. From the edge of the cane belt back for about a quarter of a mile or so, there are several dead or dying Ohias occasioned by former clearings in the near vicinity, but which are now being rapidly covered with Koa and dense undergrowth of ferns, shrubs and vines.

There has been no injury to the forest from any cause whatever during the past year.

3. Private Forest Reserves: There have been no areas of forest set apart as forest reserves excepting Government forest land. All private forests, which are owned by Bishop Estate, Pepeekeo Sugar Co. and Hakalau Plantation Co., and other private owners, are controlled by the respective owners, but are preserved for the preservation of forest as well as conserving our water supply.

From Makahanaloa right across to the lands of Honohina the upper forest boundary is fenced. From Honohina across Piha and Maulua the forest is protected by a strip of raspberry bushes so dense that sheep cannot get through, and as this unfenced strip lies makai of the sheep ranch the forest is practically protected from the inroads of cattle or sheep.

The preserving of our forests on these Islands is one of the many judicious acts of our present Executive and the future will more fully illustrate to us the far-sightedness of this policy of preserving our forests, upon which all of our running streams are dependent, and all credit is due to private owners for their coöperation in this laudable policy for the good of the country at large.

4. *Tax Exemption of Forest Land:* Forest that is fenced off and treated as a reserve may be exempted from taxation. No advantage is derived from this provision as all are assessed the same. In levying assessments there is no regard, in my opinion, as to what an equitable valuation would be, but rather to increase year by year if there is no appeal, or in other words, let the willing horse take all the load he can possibly haul for the present, with utter disregard for his future.

5. *Forest Planting:* Under this head Mr. Pullar of the Honomu Sugar Co. and Mr. Webster of the Pepeekeo Sugar Co. have informed me that they are doing some planting under the supervision and recommendation of your office so that you are familiar with what is being done. On Hakalau there has been nothing done in the way of tree planting.

Respectfully submitted,

John M. Ross,
District Forester, North Hilo.

REPORT OF MR. JOHN A. SCOTT.

South Hilo, Hawaii.

Wainaku, Hilo, Hawaii, Dec. 20th, 1906.

Dear Sir:—Yours of the 22nd Nov. was duly received and contents noted.

Present Condition of the Forest: I have nothing new to report on the condition of the forest, as I am not aware that it has been injured in any way during the past year, except that on the upper side near W. H. Shipman's ranch, there were a number of the old and mature trees blown down by a strong wind that prevailed during the early days of March.

Private Forest Reserves: The lands of Kikala, Alae and Kalalau, belonging to the Bishop Estate, under lease to the Hilo Sugar Company, and the fee simple land of Puueo, are the only private lands that are included in the forest reserve in this section, and they are being maintained as forest reserves by the owners. For the maintenance of the water supply to the streams, as with the continued clearing off of the forest, the flow of the streams has been in late years seriously affected.

The area of the above lands under forest must be in the neighborhood of 1300 acres.

Forest Planting: The Hilo Sugar Company is endeavoring to reforest a tract of land on Punahoa 1st with Black Wattle trees, but as the young plants have only been set out a short time, it is too early to report success.

Yours very truly,

John A. Scott,

District Forester.

REPORT OF MR. JOHN WATT.

Puna, Hawaii.

Olaa, Hawaii, Dec. 26th, 1906.

Dear Sir:—Beg to acknowledge receipt of yours of the 22nd inst., regarding forest in this district.

Present Extent of Native Forest: The Puna forests may be said to consist of two large belts of woods separated by the pahoehoe lava flow lying to the eastward of the Volcano road.

The heaviest belt, that to the westward, contains about 62,000 acres and is mainly of Ohia wood, while Koa is present at the higher altitudes.

To the westward the forest has been destroyed by lava flows and exists largely as pockets, with the exception of the woods between Pohoiki and Panau.

This section contains about 111,000 acres, or about 173,000 acres for the district.

Present Condition of Forest: The forest here is in its usual healthy condition as far as I have seen it.

Private Forest Reserves: There are no private forest reserves in the District of Puna.

Tax Exemption of Forest Land: None of the land owned privately in this district has been properly fenced so as to comply with the law, therefore no tax exemption of forest lands exists in this district.

Forest Planting: No forest planting has been done here, properly speaking. A few rubber trees have been set out at different points, but more as an experiment than any attempt at reforesting.

Forest Fires: There have been no fires in the forest within the past twelve months with the exception of numerous fires in that portion of the district lying between the Puna Plantation and Olaa Plantation.

The forest in this part of the district is very, very scattering, small, scrubby trees, growing in the cracks in the pahoehoe. The country is covered with a thin growth of Hilo grass and the ranchmen have frequently set fire to the grass during dry weather. This has undoubtedly done some damage to the scattering trees, but no attempt was ever made to extinguish the fires.

I have, on several occasions, called the ranch-owner's attention to these fires, but so far he evidently has not been able to prevent the parties living in that district from setting fire to the grass.

Several grass fires were also caused by people passing along the road and dropping burning cigarettes and matches.

I have nothing further of interest to communicate in this report.

I respectfully remain, Yours very truly,

J. WATT,
District Forester.

REPORT OF MR. JULIAN MONSARRAT.

Kau, Hawaii.

Kapapala Ranch, Pahala, Kau, Hawaii, Dec. 2nd, 1906.

Dear Sir:—In reply to your letter requesting a report from me on forestry conditions in my division, beg leave to reply as follows to your questions:

Present Extent of the Native Forest: I hardly know how to answer this, as a "concise description of the native forest" in my division is a difficult question to answer, unless you are ready, and willing to expend money for surveys, "for the purpose of comparison in future years." Am not good at guessing. All forest reservations that *should* be, *have been* made, under the "Forest Reserve in the District of Kau," dated and signed by Governor Carter, August 2nd, 1906, and containing an area of 65,850 acres. In passing would mention the fact, that the Hawaiian Agricultural Company in February, 1896, completed the construction of a fence 31 miles in length, around the greater portion of this reserve, at their own expense, and have kept this fence in good repair ever since, at an annual expense of $1000.00, not including an extra outlay of some $4000.00. The fence enclosed a large area of good pasture land, and it was also necessary to kill off a large number of cattle, for which they have never asked the government a "rebate" on their leases. It may also be well to mention the fact that there was nothing in their leases compelling them to erect this amount of fencing.

Present Condition of the Forest: Is very good, and the young trees show a remarkable growth within the reserve, more especially the Koa and Ohia Lehua. The larger trees were injured somewhat by the storm of a year or so ago, a number having been blown down. Where Koa is protected by undergrowth, nothing seems to injure it, except strong winds.

Private Forest Reserves: None. [But note the second paragraph above.—R. S. H.]

Tax Exemption of Forest Land: Know of none, or that any advantage has been taken of the law. Guess the government get all that is coming to them in the way of taxes, and more too, all right, all right.

Forest Planting: The Hawaiian Agricultural Company have, within a year, set out some eight thousand trees, consisting principally of Monkey-pods, which Mr. W. G. Ogg, the manager, informs me withstand the severe droughts of this district much better than any other variety. This company have started two large nurseries with the intention of planting a large area of waste and other lands this coming year, and are experimenting with a variety of trees, with the object in view of finding varieties that will prove good drought resisters. They expect to set out some hundred thousand trees next year, weather permitting. In this connection, beg to state that this is an expensive, and unsatisfactory district in which to plant trees, owing to the uncertainty of the weather. I have found this so from experience. To make tree planting a success in this district, requires a great deal of care, labor and expense.

Forestry in General: The Koa, outside of the reserve, is fast dying out, being attacked by a borer and other pests. In my opinion it would be far better to find some parasites, which would destroy these pests than it is to form mahogany companies, for as it looks to me this borer is a more rapid worker than the saw and axe. The combination of borer, saw and axe will soon clean out all the Koa, unless something is found to destroy the former, and that very soon. There is no Koa outside of the reserve that might be classed as commercial.

Steps should be taken to pass a law during the coming Legislature to prevent the cutting of young trees within the forest reserves, also for pay of forest rangers.

In my opinion it is very necessary that an appropriation for a traveling entomologist should be asked for from the Legislature.

Respectfully yours,

J. MONSARRAT.

REPORT OF MR. ERIC H. EDWARDS.

South Kona, Hawaii.

Papa Ranch, Hoopuloa, Hawaii, January 5, 1907.

Dear Sir:—I herewith beg to send in a small report which I trust will be of some interest.

In re the present limits of the forest in this district, it is practically the same as of yore, and as for the condition, I have not noticed any injuries to it during the past year. Where there are cattle running they are apt to bark trees of various sorts but not to any very great extent.

No forest reserves have been set apart in this district during the past year.

During the past year, Mr. R. v. L. Domkowicz has planted out various trees: "Logwood," "Jacaranda," "Lebanon Cypress," "Medeira Mahogany," "Rubber," Gum trees of various kinds, "Kou," "Milo," "Ironwood," "Camphor," etc., all of which are making good growth.

This is, I think, all I can say on the subject this year, as practically no changes have taken place in the conditions during the past year.

Yours very truly,

Eric H. Edwards.

REPORT OF MR. G. W. McDOUGALL.

South Kona, Hawaii.

Hookena, South Kona, Hawaii, Dec. 8th, 1906.

Dear Sir:—Yours of Nov. 22 wishing a report on subject of forest in my district which I believe extends from Ahupuaa of Hookena to Ahupuaa of Kaohe in the District of South Kona.

Taking the average elevations of present native forest in my district, it will be about from 1,800 feet elevation up to 5,500 feet elevation. There are portions of the forest in my district as low down as 12 to 1,500 ft. elevation, and on Hookena, the Mamani forest runs up to 6,500 to 7,000 ft. elevation.

The general condition of the forest is dense and uninjured, except in one portion between Honokua and Hukuiopae. In this portion cattle are being run in the forest, and they are barking and killing young Koa and other trees which have a soft juicy bark.

These cattle men are located on private land, but the cattle go over Government land and all, and as the boundaries between the different lands are not known up in the forest, I cannot see how a stop can be put to same until boundaries have been located.

Very respectfully,

G. W. McDougall.

REPORT OF HON. JOHN D. PARIS.

Central Kona, Hawaii.

Kealakekua, Dec. 27, 1906.

Dear Sir: In accordance with your request, I hereby submit my report as forester for Central Kona:

There has been very little change in the condition of the forest in my district since my last report.

The heavy forest belt is about three and a half to four miles deep and is composed mostly of Koa and Ohia, intermixed with Kolea, Pua, Opiko, Olomea and Pilo, with an undergrowth of ferns and vines.

I have noticed very few insects or blights, except the worm which eats the leaves of the Koa tree. These have been very numerous this year and in many places the Koa trees have been denuded of foliage, but their life is short and the leaves soon grow out again.

Forest Reserves: The only forest reserve in South Kona is the heavy forest on the lands of Kahauloa, Keei and Honaunau, belonging to the Bishop Estate. This is about three miles deep and four or five miles wide, and is mostly heavy forest. It has been fenced for about four years. It has grown up a jungle and in many places fine young Koa and Ohia trees are pushing up through the undergrowth.

A like reserve will probably be made on the lands of Keauhou and Kahaiuu, belonging to this Estate.

Forest Planting: Very little has been done here in this line, as we have fine forests already planted. What is needed is to preserve them and not wait until it is too late. The Territory should set an example and see that all forest tracts and public lands are protected.

The Algaroba trees are increasing along the sea cosat and large portion of the Kona coast could be covered with them if an equal interest was taken in planting them.

Forest Fires: No fires of any consequence have occurred. A small fire started at the upper edge of the woods at Honokua, but was put out before any serious damage was done.

The general forest belt of Central Kona is in good condition, excepting those portions owned by private parties and heavily stocked with cattle, there the forest is disappearing.

I remain, Yours truly,

J. D. PARIS,
Forester for Central Kona.

REPORT OF MR. J. A. MAGUIRE.

North Kona, Hawaii.

Huehue, Kailua, Hawaii, Dec. 14, 1906.

Dear Sir:—I herein submit my report on Forestry, in reply to yours of Nov. 22nd. There are no new conditions in regard to the forest of North Kona.

This report is almost a repetition of my former ones.

The Government has set aside a Forest Reserve of fine Koa on a part of the land of Honuaula, and has thus made a step forward in the preservation of the forest covered slopes of Hualalai. The Bishop Estate, I believe, has given its consent to the reservation of part of their forest land adjoining.

Kona is all a Native Forest, except where clearance has been made by the small farmers or native homesteaders. Along the sea coast where the lava flows have emptied into the sea are the barren spots. If the owners of the lands along the sea coast would only make it compulsory for their tenants to plant cocoanut trees, there are many little fertile sand beaches that might be made attractive and useful by planting the cocoanut palm. As an inducement and help to the poor Hawaiian tenants, the owners of the lands might furnish them with the young plants and make a stipulation in their leases to have them fence and care for the plants.

Between here and Puuwaawaa is a virgin forest of native trees found nowhere else on the whole group, seeds of which are being collected for the Experiment Station. These trees flourish on the bare lava with apparently very little soil. The Koa forest, which has been enclosed in the reservation of Honuaula, already begins to show the good effects of protection. The Mamani above the Koa belt on the southerly slope of Hualalai is increasing very rapidly, spreading towards the summit.

There are no private forest reservations in this section. There is very little tree planting, except a few fruit trees. The climate of Kona is so mild that it is the ideal place for the cultivation of tropical fruits, but the market and the means of transportation are so limited that there is very little fruit cultivation. The trees grow wild, no care being taken of them, and naturally the fruit is inferior and does not bear transportation. The drought of the past two years made great inroads in the growth of the forest, but recent rains have started the seeds and where they are protected from cattle grow very rapidly. My district has so far been very fortunate in escaping from forest fires.

The lantana blight has done very fine work, aided by the dry weather. What growth there is now is not strong, and in a few years I think the land will be quite clear.

Yours respectfully,

J. A. Maguire,
Forester for the District of North Kona.

LIST OF THE DISTRICT FORESTERS.

(Corrected to December 31, 1906.)

Following is a list of the (forty) District Foresters with their respective jurisdictions:

KAUAI.

ALBERT S. WILCOX.

In and for the District of Halelea.

FRANK SCOTT.

In and for the District of Koolau, excepting the land of Anahola.

GEORGE H. FAIRCHILD.

In and for the land of Anahola and the northern portion of the District of Puna, extending as far as the land of Wailua.

F. WEBER.

In and for the portion of the District of Puna, south of and including the land of Wailua, except the lands controlled by Grove Farm Plantation.

EDWARD BROADBENT.

In and for those lands in the District of Puna, controlled by the Grove Farm Plantation.

REV. J. M. LYDGATE AND WALTER D. McBRYDE.

In and for that portion of the District of Kona, lying to the east of the Hanapepe Valley.

FRANCIS GAY.

In and for that portion of the District of Kona, lying between and including the Waimea, Poomau and Kauaikanana Valleys on the west and the Hanapepe Valley on the east.

AUGUSTUS F. KNUDSEN.

In and for the District of Na Pali and that portion of the District of Kona, formerly known as the District of Waimea, lying to the west of the Waimea, Poomau and Kauaikanana Valleys.

OAHU.

ANDREW ADAMS.

In and for the District of Koolauloa.

L. L. McCANDLESS.

In and for that portion of the District of Koolaupoko extending from Koolauloa to the land of Heeia.

W. C. WEEDON.

In and for that portion of the District of Koolaupoko extending from and including the land of Heeia to the land of Kailua.

JOHN HERD.

In and for that portion of the District of Koolaupoko extending from and including the land of Kailua to Makapuu Point.

PAUL R. ISENBERG.

In and for that portion of the District of Kona extending from Makapuu Point to and including Manoa Valley.

WALTER F. DILLINGHAM.

In and for the Districts of Ewa and Waianae.

A. M. NOWELL.

In and for the District of Waialua.

MOLOKAI.

JAMES MUNRO.

In and for the Island of Molokai, excepting that portion between the lands of Pukoo and Halawa, inclusive.

C. C. CONRADT.

In and for the portion of the east end of the Island of Molokai, lying between the lands of Pukoo and Halawa.

LANAI.

CHARLES GAY.

In and for the Island of Lanai.

MAUI.

H. P. BALDWIN.

District Forester at Large for the Island of Maui.

L. BARKHAUSEN.

In and for the District of Lahaina.

C. B. WELLS.

In and for the District of Wailuku.

H. A. BALDWIN.

In and for the District of Hamakuapoko and the western half of the District of Hamakualoa.

W. F. POGUE.

In and for the District of Koolau and the eastern half of the District of Hamakualoa.

C. J. AUSTIN.

In and for the District of Hana.

L. VON TEMPSKY.

In and for the District of Makawao.

L. VON TEMPSKY and DR. J. H. RAYMOND.

In and for the Districts of Kula, Honuaula, and the lands beyond, to and including Kaupo.

HAWAII.

T. S. KAY.

In and for the District of North Kohala, and that portion of the District of Hamakua lying between the District of North Kohala and the Waimanu Valley.

E. E. CONANT.

In and for the District of South Kohala.

DAVID FORBES.

In and for that portion of the District of Hamakua from and including the Waimanu Valley to the District of Hilo.

JOHN M. ROSS.

In and for that portion of the District of Hilo extending from the District of Hamakua to the land of Makahanaloa.

JOHN A. SCOTT.

In and for that portion of the District of Hilo extending from the District of Puna to and including the land of Kikala.

JOHN WATT.

In and for the District of Puna.

JULIAN MONSARRAT.

In and for that portion of the District of Kau extending from the District of Puna to and including the land of Punaluu.

GEORGE C. HEWITT.

In and for that portion of the District of Kau extending from the land of Punaluu to the District of Kona.

ERIC H. EDWARDS.

In and for that portion of the District of South Kona extending from the District of Kau to the land of Kaohe.

WM. R. CASTLE and GEO. W. McDOUGALL.

In and for that portion of the District of South Kona extending from and including the land of Kaohe to the District of North Kona.

JOHN D. PARIS.

In and for that portion of the District of North Kona extending from the District of South Kona to and including the land of Kahaluu.

JOHN A. MAGUIRE.

In and for that portion of the District of North Kona extending from Kahaluu to the District of South Kohala.

LIST OF DISTRICT FIRE WARDENS.

(Corrected to December 31, 1906.)

Following is a list of the (fifty) District Fire Wardens, with their respective Districts:

CHIEF FIRE WARDEN

RALPH S. HOSMER,

Superintendent of Forestry, *ex officio*

DEPUTY FIRE WARDEN AT LARGE

DAVID HAUGHS.

In and for the Territory of Hawaii.

DISTRICT FIRE WARDENS.

KAUAI.

C. W. HUDSON.

In and for the Wainiha Valley, District of Halelea.

W. F. SANBORN.

In and for the District of Halelea, excepting the Wainiha Valley.

FRANK SCOTT.

In and for the District of Koolau, excepting the land of Anahola.

GEORGE H. FAIRCHILD.

In and for the portion of the Districts of Koolau and Puna, extending from the land of Anahola to the land of Olohena, inclusive.

F. WEBER.

In and for the portion of the District of Puna, south of and including the land of Wailua.

REV. J. M. LYDGATE.

In and for that portion of the District of Kona, formerly known as the District of Koloa.

FRANCIS GAY.

In and for that portion of the District of Kona, lying between and including the Waimea, Poomau and Kauaikanana Valleys on the west and the Hanapepe Valley on the east.

AUGUSTUS F. KNUDSEN.

In and for the District of Na Pali and that portion of the District of Kona, formerly known as the District of Waimea, lying to the west of the Waimea, Poomau and Kauaikanana Valleys.

OAHU.

ANDREW ADAMS.

In and for the District of Koolauloa.

FRANK PAHIA.

In and for that portion of the District of Koolaupoko, extending from the Koolauloa District line to the land of Heeia.

GEORGE CAMPBELL.

In and for that portion of the District of Koolaupoko, extending from and including the land of Heeia to the land of Kailua.

JOHN HERD.

In and for that portion of the District of Koolaupoko, extending from and including the land of Kailua to Makapuu Point.

CHARLES H. BAILEY.

In and for that portion of the District of Kona, extending from Makapuu Point to Palolo Valley.

H. J. RHODES.

In and for Palolo Valley, District of Kona.

W. M. GIFFARD.

In and for that portion of the District of Kona, lying between Pauoa and Manoa Valleys.

G. H. MOORE.

In and for Pauoa and Nuuanu Valleys, District of Kona.

WALTER F. DILLINGHAM.

In and for the District of Ewa and that portion of the District of Waianae lying to the East of the Waianae Mountains.

F. MEYER.

In and for that portion of the District of Waianae lying to the West of the Waianae Mountains.

BYRON O. CLARK.

In and for that portion of the lands of Wahiawa and Waianae-uka, lying to the east of the main Government road from Ewa to Waialua.

A. M. NOWELL.

In and for the District of Waialua.

MOLOKAI.

JAMES MUNRO.

In and for the Island of Molokai, excepting that portion between the lands of Pukoo and Halawa, inclusive.

C. C. CONRADT.

In and for that portion of the east end of the Island of Molokai, between the lands of Pukoo and Halawa, inclusive.

LANAI.

CHARLES GAY.

In and for the Island of Lanai.

MAUI.

H. P. BALDWIN.

Fire Warden at Large, for the Island of Maui.

LOUIS BARKHAUSEN.

In and for the District of Lahaina.

R. C. SEARLE.

In and for the District of Kaanapali.

C. B. WELLS.

In and for the District of Wailuku.

H. A. BALDWIN.

In and for the District of Hamakuapoko and the west half of the District of Hamakualoa.

W. F. POGUE.

In and for the District of Koolau and the east half of the District of Hamakualoa.

JOHN CHALMERS.

In and for the District of Hana.

HUGO HANEBERG.

In and for the District of Kipahulu.

W. H. RAYMOND, M. D.

In and for the Districts of Honuaula and Kahikinui.

L. VON TEMPSKY.

In and for the Districts of Kula and Kaupo.

HAWAII.

T. S. KAY.

In and for that portion of the north half of the District of Kohala, extending from the land of Kaauhuhu to the Hamakua District line.

SAM. F. WOODS.

In and for that portion of North Kohala, extending from the northern boundary of the land of Kawaihae I to and including the land of Kaauhuhu.

E. E. CONANT.

In and for the District of South Kohala.

DAVID FORBES.

In and for the western part of the District of Hamakua, extending to the boundary of the land of Paauhau.

JAMES GIBB.

In and for that portion of the District of Hamakua, extending from the western boundary of the land of Paauhau to the boundary of the land of Kukaiau.

ALBERT HORNER.

In and for that portion of the District of Hamakua, extending from and including the land of Kukaiau to the Hilo District line.

JOHN M. ROSS.

In and for that portion of the District of Hilo, extending from the Hamakua District line to the land of Makahanaloa.

JOHN T. MOIR.

In and for that portion of the District of Hilo, extending from and including the land of Makahanaloa to the land of Kikala.

JOHN A. SCOTT.

In and for that portion of the District of Hilo, extending from the Puna District line to and including the land of Kikala.

JOHN WATT.

In and for the District of Puna.

WILLIAM G. OGG.

In and for that portion of the District of Kau, extending from the Puna District line to and including the land of Punaluu.

CARL WOLTERS.

In and for that portion of the District of Kau, extending from the land of Punaluu to the Kona District line.

ERIC H. EDWARDS.

In and for that portion of the District of Kona, extending from the Kau District line to and including the land of Kaapuna.

GEORGE W. McDOUGALL.

In and for the portion of the District of Kona, extending from the land of Kaapuna to and including the land of Hookena.

JOHN D. PARIS.

In and for that portion of the District of Kona, extending from the land of Hookena to and including the land of Kaawaloa.

T. C. WHITE.

In and for that portion of the District of Kona, extending from the land of Kaawaloa to the land of Kahaluu.

JOHN A. MAGUIRE.

In and for that portion of the District of Kona, extending from the land of Kahaluu to the Kohala District line.

FOREST RANGER.

DAVID KAPIHE.

In and for that section of the District of Kona, Island of Oahu, bounded on the east by Manoa Valley, on the north by the Konahuanui Mountain Range, on the west by Pauoa Valley and on the south by the makai edge of the eucalyptus forest, the Makiki reservoir and the mauka boundary of the Judd land in Makiki and Manoa.

Report of the Librarian.

Honolulu, Hawaii, Dec. 31, 1906.

Board of Commissioners of
Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:

Under the authority conferred on me by the Board at a meeting held on March 9, 1904, when it was resolved that the library and the routine work of the office be placed in my charge, I have the honor to submit the following report for the past year.

LIBRARY.

The statute creating the Board provides that "it shall be the duty of the Board to secure copies of the laws of other States, Territories, and countries, and other publications germane to the subject matter of this Act, and make the same available for public information and consultation."

The aim of the library is to cover the field of general agriculture in its relation to tropical and sub-tropical conditions, especial attention being paid to the collection of publications having to do with Botany, Entomology, Forestry and Animal Industry. The library now numbers between four and five thousand books and pamphlets, besides serial publications in completed volumes and currently received.

Accessions to the library are received through purchase, gift and exchange, the attempt being made, as opportunity and means permit, to secure the standard authorities and the other more important books in the several branches of Natural Science named above.

The policy of the Board is to maintain its library as a free reference library, open to the public, daily, during office hours. As yet the library has not been used as generally as could be wished. This is probably due in part to the fact that some of those who could most profitably use it are not able to do so because of not residing in the vicinity of Honolulu, while others who might consult the library are not aware of what it has to offer. To meet the latter objection the Board staff has lost no opportunity of calling the attention of the public to the existence of the library and of cordially extending an invitation to all to make use of it. During the latter part of 1906 more persons visited the library than at any previous time and those who came were almost without exception persons who could and did profit by so doing.

An important feature of the library is the current periodicals regularly received. A full list was given in the Report of the Board for 1905, and need not be repeated here.

In the purchase of new books during the year the aim has been to add to the standard works on Entomology and Forestry now on the shelves and to continue systematically the collection of Floras of tropical and sub-tropical countries in all parts of the world.

Among the important accessions received by purchase during 1906 may be mentioned the following:

Botany.

Title.	Author.
Flora Capensis (7 volumes)	Harvey & Sonder
Flora, British India (7 volumes)	Hooker
Flora, Tropical Africa (8 volumes)	Oliver & Thiselton-Dyer
Flora, Mauritius and the Seychelles	Baker
Flora, British West Indian Islands	Grisebach
Flora, Madeira	Lowe
Flora, Southern United States	Chapman
Flowering Plants of Western India	Nairne
Vascular Plants from Surinam	Pulle
Southern Wild Flowers and Trees	Lounsberry
The Tree Book	Rogers
History of Botany	Sachs
Plant Geography	Schimper
Enumeration of Hawaiian Plants	Mann
Indigenous Flowers of the Hawaiian Islands	Sinclair
Pflanzenfamilien (Phanerogams) (11 vols.)	Engler & Prantl

Forestry.

The Forester	Nisbet
Handbuch der Forstwissenschaft	Lorey
Wald, Klima und Wasser	v. Liburnau
Die Klimate der Erde	Woeikof
Einwirkungen des Waldes	Ebermayer
Forst Asthetik	v. Salisch
Fortwissenschaft	Fischbach
History of the Lumber Industry of America	Defebaugh
Timbers of Commerce	Stone
Principal Species of Wood	Snow
Trees	Ward
Studies in Forestry	Nisbet
Forest Utilization, Mensuration and Sylviculture	Schenck
Manual of Forest Engineering for India	Rogers

Entomology.

Butterflies of the West Coast	W. G. Wright
The Coccidae of Kansas	S. J. Hunter
Microscoper's Vade Mecum	A. B. Lee
American Almanac of Photography.	
Entomology	J. W. Folsom
Explanations of Terms Used in Entomology	J. B. Smith
American Insects	V. L. Kellog
Trans. Ent. Soc. London. (1877-1890)	
The Entomologist (1840-1905)	
Entomologists' Monthly Magazine (1864-1905)	
Anatomy of the Blow-fly (2 vols.)	Lowne
List of Hemiptera in the British Museum	Dallas

A large number of important Coccid papers and a number of separates bearing on our native insect fauna.

General Science.

A Naturalist on the River Amazon	Bates-Clodd
A Naturalist's Wanderings in the Eastern Archipelago	Forbes
The Malay Archipelago	Wallace
Land Revenue of British India	Baden-Powell

On Seedlings	Lubbock
Research Methods in Ecology	Clements
Odorographia	Sawyer
New Creations in Plant Life	Harwood
Irrigation Farming	Wilcox
Tropical Agriculture	Nicholls
Volcanoes of the Hawaiian Islands	Brigham
The Teaching Botanist	Ganong
Classification of Flowering Plants	Rendle
Treatise on the Physiology of Plants	Sorauer
Disease in Plants	Ward
Timber and Some of Its Diseases	Ward

Rubber.

Para Rubber (Second edition)	Herbert Wright
The Chemistry of India Rubber	Carl Otto Weber
Coffee and India Rubber in Mexico	Romero
India Rubber, Gutta-Percha, and Balata	Brannt

Matters in connection with the books and publications on Entomology have been handled by Mr. Jacob Kotinsky, of the Division of Entomology, who has also directed the preparation of a card catalog (by author, subject and series) of the Entomological publications. Later this catalog will be extended to cover the other books in the library.

The recording of the accessions of current periodicals and the arrangement of the magazines on the library shelves was performed by Mr. David Haughs up to May, 1906. Since then it has been done by Miss Ella K. Dayton, the clerk of the Division of Entomology, who has also carried out certain other routine work in connection with the library.

USE OF THE BOARD ROOM.

Besides serving as the library, the large room in the office building is used for the regular meetings of the Board and also, through the courtesy of the Commissioners, for the meetings of other organizations having to do more or less directly with the advancement of agricultural science.

During the year forty-eight evening meetings have been held. The following list gives the names of the organizations and the number of meetings held by each:

Hawaiian Entomological Society	12
Honolulu Improvement Advisory Board ..	13
Pawaa Improvement Club	3
McCully Improvement Club	4
Waialae, Palolo & Kaimuki Imp. Club......	3
Farmers' Institute	2
Hawaiian Poultry Association	11
Total	48

Because of its accessibility and because it is well lighted, screened, and of sufficient size to accomodate the organizations that use it, the Board room is well adapted for such meetings. That the privilege of using the room is appreciated by the several societies is attested by several votes of thanks that have been passed during the year. From this use of its building the Board gains the advantage of bringing the public in touch with the work done by its several divisions and with the resources of its library.

During the year the Board itself has held nine regular meeting in its office; three special meetings were also held down town. Seven forest reserve hearings have also been held during the year in the office of the Board, to secure expressions of public opinion on various forest reserve projects.

EXHIBITS OF FRUITS AND WOODS.

The collections of fruits, indigenous woods, and seed from island grown trees continue to arouse interest not only in visitors to Honolulu but also among local residents. The collection of fruits contains many specimens never seen in the markets. During the year a number of particularly rare fruits have been added, which will repay a visit of inspection.

As in the past Mr. Alexander Craw has had charge of preparing the fruits for exhibition, a task requiring skill and careful attention to detail.

Visitors.

During the year 262 persons have registered in the record book, kept in a conspicuous place near the entrance to the building. The record by months is as follows:

January	32
February	16
March	44
April	17
May	16
June	18
July	13
August	10
September	23
October	25
November	21
December	27
Total	262

As many persons forget or neglect to sign the register this does not represent all those who have visited the office during the year, nor does it include more than a small part of the persons who have called to consult members of the staff on one subject or other in connection with the work of the Board.

ROUTINE WORK.

In common with many similar organizations much of the time of the staff of the Board of Agriculture and Forestry is consumed with routine work. Owing to the necessity for frequent reports there is more stenographic work and typewriting to be done than would perhaps appear from the size of the staff, while the regular correspondence of the Board is steadily increasing.

A record kept by the stenographer for the "Board" and "Forestry" letters, shows that during the year letters were prepared and sent out as follows: Board business, 58; Library, 55; Division of Forestry, 584; Forest Nurseryman, 405; Forest Fire business, 100; total, 1,202.

Bearing in mind the absence of the Superintendent of Forestry during the early summer months, this is a decided increase over the correspondence of former years.

Miss Melika Peterson has continued during the year as general clerk of the Board and stenographer of the Division of Forestry. Her faithful and conscientious service deserves more than passing recognition.

Distribution of Seed and Publications.

In the early part of the year the distribution was completed of the 1905 quota of congressional vegetable seed, furnished by the Delegate to Congress and, with the coöperation of the Superintendent of Public Instruction, sent out through this office to the various public schools throughout the Territory. As long as the seed lasted every family represented in each school had a share. In all something over 15,000 packages of seed were sent out.

In August the Delegate sent his quota of the U. S. Department of Agriculture Yearbook for 1905 to be distributed through this office. Copies were sent to each public school principal and to all who applied under an offer published in the newspapers. Some copies of the 1905 and also of the 1903 yearbooks still remain on hand. They may be had on application.

The second Report of the Board of Agriculture and Forestry, for the year 1905, delayed in preparation, was finally issued on Oct. 13, 1906. An edition of 2,500 copies was struck off and in addition 500 separates of the report of each of the four divisions were printed for distribution to divisional correspondents outside of the Territory. The full report was widely distributed throughout the Territory.

To facilitate the sending out of this report and to do certain other extra clerical work, Miss Marie Legros was appointed in October for a temporary period as special clerk. She continued to serve at the end of the year.

Forester and Agriculturist.

The publication of the Hawaiian Forester and Agriculturist, a monthly magazine issued under the direction of the Board, has been continued during the year. This journal is devoted to Forestry, Entomology and Agriculture and to the development of what are locally termed the "allied industries." Under the efficient editorship of Mr. Leopold G. Blackman, it has come to have an established place among local periodicals.

The Forester and Agriculturist deserves a much wider circulation than it now has, for each volume contains many valuable contributions of general interest to those concerned with Agriculture under sub-tropical conditions. The 1906 volume (No. III) contains 422 pages, illustrated by 11 plates and 1 wood cut. The financial condition of the Board does not permit the free distribution of the Forester and Agriculturist. Accordingly, while issued under the auspices of the Board, the magazine is published by the Hawaiian Gazette Company of Honolulu, from whom it may be obtained. To subscribers anywhere in the United States the yearly rate is one dollar; to those in foreign countries, one dollar and a quarter.

BUILDINGS AND GROUNDS.

A few minor changes have been made in the office building during the year, the most important being the completion in January of the rebuilding of the book cases in the library room and the construction of a map case in the office of the Superintendent of Forestry. At the same time improvements were made in the Entomological laboratory and in the insect-proof room, particularly by the construction in the laboratory of a cabinet, specially designed for controlling the light, for careful work with the compound microscope.

Of the changes in the other buildings on the Nursery grounds the most important is the transformation of the old fumigating house into a modern dark room, equipped with water, gas, and special appliances for the convenience of the photographer. The dark room is for the use of all of the Board staff, though so far only entomological work has been done in it. The dark room was constructed in August.

Earlier in the year an addition was made to the stable, which permitted the rearrangement of the stalls and gave more room for the carriage shed and the feed and harness room. There are now one regular and three box stalls. These changes were made necessaray by the needs of the Division of Animal Industry. By the erection of a partition at one end of the wagon shed a seed room was obtained in which are stored the seed collected in and around Honolulu.

By the resignation of Mr. C. J. Austin, the cottage in the Nursery grounds until recently occupied by him is made vacant. No disposition had been made of it on December 31. As Mr. Austin has several times pointed out, the house is out of repair. It must be put in order before it can again be occupied.

Grounds.

No noticeable changes have been made in the nursery grounds during the year except the completion of an entrance driveway, begun in 1905, on the east side of the Board building. In connection with the making of the roadway, the stable yard was filled in with coral rock and black sand. The sidewalks about the nursery grounds were given a top dressing of black sand at the same time. The grounds are kept in condition with the aid of two prisoners detailed by High Sheriff Henry. Without these men it would be impossible to maintain the grounds in satisfactory shape. A good deal could still be done toward making the nursery more attractive. It is expected that a number of improvements can be made during the coming year.

Very respectfully,

RALPH S. HOSMER,
Librarian.

TERRITORY OF HAWAII
BOARD OF AGRICULTURE AND FORESTRY

DIVISION OF FORESTRY
RALPH S. HOSMER, SUPERINTENDENT

REPORT

OF THE

DIVISION OF FORESTRY

FOR THE YEAR ENDING
DECEMBER 31, 1907.

REPRINT FROM THE FOURTH REPORT OF THE BOARD OF
COMMISSIONERS OF AGRICULTURE AND FORESTRY

HONOLULU:
BULLETIN PUBLISHING CO., LTD.
1908

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DIVISION OF FORESTRY.

Report of the Superintendent of Forestry.

Honolulu, Hawaii,
December 31, 1907.

The Board of Commissioners of
Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:—

I have the honor to present my fourth annual report of the work of the Division of Forestry.

On the part of the Territory itself the points of notable interest during 1907 in the history of forestry in Hawaii are a definite annunciation of policy in regard to the two main classes of Hawaiian forest; the extension of the forest reserve system, through the setting apart of additional areas and the completion of field work bearing directly on the creation of other new reserves; the establishment of a systematic exchange of seed with Botanic Gardens and other similar institutions; and an amendment to the forest law giving to the Governor more extended power in the creation of forest reserves.

On the part of private interests and corporations there is also much that is worthy of record. Particularly to be noted is the increasing interest in tree planting on waste lands; the extension of the rubber plantations on Maui; the beginning of a coconut industry; and especially the real establishment of the lumber industry in the leeward districts on Hawaii through the signing of a contract between the Hawaiian Mahogany Lumber Company and the Santa Fe Railway System whereby there will be sent to the mainland during the next five years over 2,500,000 Ohia Lehua railroad ties.

In the successful development of any undertaking much depends on a good start. The various branches of forest work that have just been enumerated are practically all in the initial stage. Begun as each has been in accordance with orderly and carefully made plans, the things undertaken during 1907 may justly be regarded in each case as the auspicious beginning of a permanently important enterprise.

STAFF AND APPROPRIATION.

During 1907 the official staff of the Division of Forestry has consisted of the Superintendent of Forestry (Ralph S. Hosmer) and the Forest Nurseryman (David Haughs.) Of the volunteer staff—the District Foresters and the District Fire Wardens—there have been some changes in personnel. Revised lists of the gentlemen serving in these positions are given elsewhere in this report. David Kapihe has continued as Forest Ranger for the Tantalus Heights District. No other forest rangers have been appointed.

For the biennial period ending June 30, 1907, the item in the appropriation bill for the salaries and pay rolls of the Division of Forestry was $5,000. per annum. The amount per annum allotted to current expenses was $5,450. For the present fiscal period (July 1, 1907 to June 30, 1909) the Division of Forestry receives the following allotment:

Salaries and pay rolls, per annum,.............	$7,620.
Incidentals and Current Expenses, per annum,..	4,960.

The seeming increase in the salary item is due to the transfer of certain laborers from the general pay roll of the Board to that of the Division of Forestry. The number employed remains the same.

FOREST RESERVES.

Since the organization of the Division of Forestry the creation of forest reserves has rightly been held to be the forest work of first importance. The successful development of agriculture in Hawaii, especially in the districts where irrigation is necessary, is so closely bound up with the welfare of the forest that it is of paramount importance that the forest cover on the water sheds be carefully and wisely managed. It cannot too often be said that the chief value of by far the greater part of the Hawaiian forest does now and always must rest in the influence that the forest exerts on the conservation of water. For the maintenance of a permanent, dependable supply the forest is essential.

The methods that are followed in the creation of forest reserves in Hawaii, with other information in regard to the reserves established, have been covered fully in former reports. It may, however, not be out of place here to state again that the prime object in the creation of all but one of the thirteen forest reserves that have so far been established is to protect the forest on the water sheds of the important streams. These forest reserves are essentially "protection forests." Their most valuable product is water. By safeguarding the sources of the supply they render direct economic return to the Territory.

RESERVE ESTABLISHED.

On June 12, 1907, there was created by proclamation of Acting Governor A. L. C. Atkinson the Na Pali-Kona Forest Reserve on the Island of Kauai. This reserve has a total area of 60,540 acres, of which 40,650 acres is Government land. The Na Pali-Kona Forest Reserve embraces the great Waimea Upland and the major part of the table-land in the District of Na Pali. This section is important because from it come numerous streams that are now or that later can be used for power development and irrigation. From its location and topography the land included in the reserve cannot permanently be used to advantage other than for water production. Its value depends almost wholly on the water that can be got from it. Accordingly this reserve falls naturally into the "protection forest" class.

Of the Government land in the Na Pali-Kona Forest Reserve (40,650 acres) 3980 acres was not under lease and could definitely be set apart at once. Under the amended forest law the remainder of the Government land now under lease—for the most part to the Knudsen Estate—will automatically come into the fully reserved class at the expiration of the existing leases. Most of the private lands in this reserve are owned or controlled by Messrs. Gay and Robinson. For some years both the Knudsen Brothers and Messrs. Gay and Robinson have protected the area now officially reserved and maintained it as two private forest reserves. The wild cattle have been systematically hunted and kept down; as a result the forest as a whole is in excellent condition.

PROJECTED RESERVES.

Owing chiefly to matters that have arisen in connection with the change in August of the Territorial Administration, several other reserve projects that naturally belong to 1907 go over to 1908 for final action. Three proposed forest reserves pending final action on December 31, 1907 are the West Maui Forest Reserve, total area 44,440 acres; the Makawao Forest Reserve, also on Maui, 1793 acres; and the Waiaha Spring Forest Reserve in North Kona, Hawaii, 193 acres.

During 1907 field work has been completed and the surveys of boundaries made for a large additional forest reserve on Kauai, for the Kohala Mountain Forest Reserve on Hawaii and for additions to the reserves on the Waianae Mountains on Oahu. These projects now only await the preparation of the technical descriptions to be finally put through. Field work done in Kona, Hawaii and on the slopes of Mount Haleakala on Maui during the autumn of 1907 will in due course lead to the creation of other reserves, so that by the end of 1908 the chain of the principal forest reserves throughout the Territory should be practically complete.

STATISTICS OF EXISTING FOREST RESERVES.

The total area within the boundaries of the established forest reserves on December 31, 1907 is 397,687 acres. Of this 252,818 acres is Government land. The following tables show chronologically and by counties various data in connection with the thirteen Hawaiian forest reserves.

For a detailed statement of the areas of the various lands making up the several reserves, reference should be made to the tables in the report of the Division of Forestry for 1906, pages 32 to 42. In that report also may be found maps showing the location of the forest reserves on each of the four larger islands of the Territory.

TABLE I.

FOREST RESERVES--TERRITORY OF HAWAII.

ARRANGED IN CHRONOLOGICAL ORDER.

No.	Name	District	Island	Total Area Recommended to be Reserved	Area Government Land	Area Private Land	Date of Proclamation	Proclamation Signed by
				Acres	Acres	Acres		
1	Kaipapau	Koolauloa............	Oahu	913	913	....	Nov. 10, 1904	G. R. Carter
2	Hamakua Pali..	Hamakua	Hawaii ..	18940	16333	2607	Dec. 23, 1904	" "
	Total for the	year ending Dec	31, 1904	19853	17246	2607		
3	Hilo......	Hilo........	Hawaii ..	110000	60223	49777	July 24, 1905	A. L. C. Atkinson
4	Koolau, Maui ..	Koolau, Hamakualoa................	Maui......	42969	30230	12739	Aug. 24, 1905	" "
5	Halelea, ...	Halelea	Kauai.....	37500	10990	26510	Aug. 24, 1905	" "
	Total for the	year ending Dec.	31, 1905	190469	101443	89026		
6	Kealia	Puna......	Kauai.....	9935	7385	2550	Mar. 9, 1906	" "
7	Ewa	Ewa Waianae and Waialua............	Oahu	28550	5151	23399	Mar 9 1906	" "

TABLE I.—Continued

No.	Name	District	Island	Total Area Recommended to be Reserved	Area Government Land	Area Private Land	Date of Proclamation	Proclamation Signed by
				Acres	Acres	Acres		
8	Honuaula	Kona	Hawaii	665	665	....	April 4, 1906	A L. C. Atkinson
9	Kau	Kau	Hawaii	65850	59618	6232	Aug. 2, 1906	G. R. Carter
10	Waianae kai	Waianae	Oahu	3257	3150	107	Sept. 7, 1906	" "
11	Lualualei	Waianae	Oahu	3743	3743	....	Nov 30, 1906	" "
12	Hana	Hana	Maui	14825	13767	1058	Nov. 30, 1906	" "
	Total for the	year ending Dec.	31, 1906	126825	93479	33346		
13	Na Pali-Kona	Na Pali and Kona	Kauai	60540	40650	19890	June 12, 1907	A. L. C. Atkinson
	Total for the	year ending Dec	31. 1907	60540	40650	19890		
	Grand Total			397687	252818	144869		

Table II shows the same data for the existing reserves, arranged by islands and counties.

TABLE II.

FOREST RESERVES--TERRITORY OF HAWAII

ARRANGED BY ISLANDS AND COUNTIES

No.	Name	District	Island	Total Area Recommended to be Reserved	Area Government Land	Area Private Land	Date of Proclamation	Proclamation Signed by
			COUNTY OF KAUAI					
				Acres	Acres	Acres		
5	Halelea	Halelea	Kauai	37500	10990	26510	Aug. 24, 1905	A. L. C. Atkinson
6	Kealia	Puna	"	9935	7385	2550	Mar. 9, 1906	" "
13	Na Pali-Kona	Na Pali and Kona	"	60540	40650	19890	June 12, 1907	" "
		Total	....	107975	59025	48950		
			COUNTY OF OAHU					
				Acres	Acres	Acres		
1	Kaipapau	Koolauloa	Oahu	913	913	....	Nov. 10, 1904	G. R. Carter
7	Ewa	Ewa, Waianae and Waialua	"	28550	5151	23399	Mar 9, 1906	A L. C. Atkinson
10	Waianae-kai	Waianae	"	3257	3150	107	Sept. 7 1906	G. R. Carter
11	Lualualei	Waianae	"	3743	3743	....	Nov. 20, 1906	" "
		Total	....	36463	12957	23506		

TABLE II—Continued

No.	Name	District	Island	Total Area Recommended to be Reserved	Area Government Land	Area Private Land	Date of Proclamation	Proclamation Signed by
			COUNTY OF MAUI					
				Acres	Acres	Acres		
4	Koolau, Maui	Koolau, Hamakualoa..........	Maui	42969	30230	12739	Aug. 24. 1905	A. L C. Atkinson
12	Hana	Hana......	“	14825	13767	1058	Nov. 30, 1906	G. R. Carter
		Total.........	....	57794	43997	13797		
			COUNTY OF HAWAII					
				Acres	Acres	Acres		
2	Hamakua - Pali	Hamakua	Hawaii	18940	16333	2607	Dec. 23, 1904	G. R. Carter
3	Hilo	Hilo.........	“	110000	60223	49777	July 24, 1905	A. L. C Atkinson
8	Honuaula	Kona	“	665	665	....	Apr. 4, 1906	“
9	Kau..................	Kau.............	“	65850	59618	6232	Aug. 2, 1906	G. R. Carter
		Total.........	....	195455	136839	58616		
		Grand Total	....	397687	252818	144869		

FOREST RESERVE POLICY.

In addition to the increase in area through lands actually set apart the most important events in connection with forest reserve work in Hawaii during 1907 have been certain changes in the forest law and a definite statement of the forest reserve policy as it applies to the two main classes of forest in Hawaii.

Amendment to Forest Law.

Act 4 of the Session Laws of 1907 amends the already amended Section 379 of Chapter 28 of the Revised Laws of Hawaii by making the section read that "the Governor may set apart any Government land or lands whether under lease or not, as forest reservations, provided, however, that on lands under lease the reservation shall not take effect until the expiration of the existing lease, or in any way affect the rights acquired under the lease."

Before the enactment of this amendment land that was under lease could only be set apart within the two years prior to the expiration of the lease. Under the new arrangement all Government land within the boundaries of a given forest reserve may be set apart at any time; the full reservation on leased land to go into effect, automatically, at the expiration of the lease. The advantage of the present law is that it tends to establish the forest reserves more firmly. Under this law the policy of the Government in regard to the future use of the lands in any given forest reserve is clearly defined. Being assured that the Government forest lands in a certain section are to be reserved, private owners of adjoining tracts are more likely to cooperate with the Board of Agriculture and Forestry in maintaining their own lands under forest cover.

Under the amended law there have been, through proclamations of the Governor, several changes in the status of Government lands in existing forest reserves, notably in the Koolau and the Hana Forest Reserves on Maui.

The Two Classes of Hawaiian Forest.

In June 1907 an application for the right to lumber the forest on the Government land of Piihonua, in the Hilo District, Island of Hawaii, brought out a definite statement of the fundamental differences in the two main classes of Hawaiian forest and the reasons why it is necessary that radically different methods should be followed in their management.

In a report dated July 18, 1907 (published in the Hawaiian Forester and Agriculturist for August 1907; Volume IV, Number 8; pages 252 to 256) the Superintendent of Forestry pointed out that in Hawaii there are two main classes of forest: the water-bearing PROTECTION FOREST, essentially of value because of the *water* it can produce; and the non-water-bearing COMMERCIAL FOREST, the main value of which rests in the *wood and timber* that it yields.

In the water-bearing forest the most important product is *water*, and consequently the forest ought to be so managed as to yield permanently the largest possible dependable supply. With the short water sheds, the steep slopes and the susceptibility of the Hawaiian forest to injury, to secure the best results in most of the water-bearing forests it is essential that the forest cover be kept strictly intact—that the forest be maintained exclusively as a protection forest.

In the leeward districts on Hawaii a different condition prevails. Here there are no permanent streams and but few springs. Consequently the forest is not needed for water shed protection, but is to be reckoned chiefly of value because it can be made to yield wood and timber. Much of the land in Kona, Puna and Kau can be used to better advantage for growing trees than for any other purpose. Obviously the wise use of this type of forest is so to manage it that it shall yield repeated crops of valuable timber. The object in both cases is to put the forest to wise use; to make it serve the purpose for which it is best adapted. In the one case its most valuable product is water; in the other it is wood.

The Piihonua forest protects the head waters of one of the most important streams in the Territory—the Wailuku River. It is above all else of value because of its influence on the flow of this stream. Essentially a protection forest it should be kept strictly intact. This was the gist of the report of the Superintendent of Forestry.

The Board of Agriculture and Forestry approved the recommendation that the Piihonua forest should not be lumbered. The Commissioner of Public Lands, backed by Governor Carter, acted in accordance with the recommendation of the Board. There was thus established a precedent in the forest policy of the Territory that is of great importance.

NEEDS IN FOREST WORK.

Owing to the lack of a sufficient appropriation to permit the employment of forest rangers, the Division of Forestry has not been able to render the efficient service in caring for the forest reserves that is essential to their best management. It is a defect that must be overcome before the forest reserves can be made to do their full duty. Consequently the fight for forest rangers must continue to be waged until an efficient system of administration is provided for.

The absence of forest rangers reacts unfavorably on the forest reserve system in two ways. First, it is now impossible to take the effective steps toward suppressing trespass by stock and toward preventing forest fire that would immediately follow the appointment of forest rangers. Second, it naturally follows that private corporations and individuals hesitate, as conditions now are, to turn over their forest land to the Board of Agriculture and Forestry for management. To secure the best results all the lands in any given forest reserve should be under one central authority. It stands to reason that men whose business it is to manage forests must know more about the matter than do persons to whom the care of the forest is but one of many intertests. Given an administrative force, the Territorial Forest Service could manage the forest lands better than can the individual. When the Government can offer this inducement, there will be no trouble in getting the private owners to cooperate with the Government in the proper management of the forest reserves.

In this connection it may be encouraging to note that Hawaii is now but passing through a stage similar to that in which about a decade ago the National Forests on the American mainland stood for several years. Although at present the Hawaiian forest reserves may seem to be more in evidence on paper than on the ground, they have nevertheless been definitely set apart, so that as soon as means of administration are provided there will be no delay in bringing the whole area under efficient management. What has been done so far is a necessary and indispensable step. This fact justifies the outlay that has been made.

Fencing.

Another need in local forest reserve work is that certain forest reserve boundaries should be fenced. Wherever possible natural barriers are used to mark the reserve limits, but there are many places where fences are required. Often a short stretch of fence will protect large areas. There should be a special fund appropriated by the next Legislature for this purpose.

Extermination of Goats.

One other point of needed legislation may also be mentioned here. Act 116 of the Session Laws of 1907 provides that every person hunting with fire arms shall pay to the County where he is to hunt, a tax of five dollars. The law is a good one but it should be so amended as to provide for the free shooting of wild goats in established forest reserves. These animals do much damage and should be exterminated. By a permit system, it could easily be arranged so that the privilege of hunting without a license could not be abused. The gain to the County from the destruction of the goats would off-set what little revenue might be lost. Already in one case, on Kauai, the Supervisors have authorized the remission of the tax, where a party of young men was systematically to hunt the goats in one of the Kauai forest reserves.

FOREST EXTENSION.

The two main branches of the Division of Forestry are the Sections of Forest Reserves and of Forest Extension. Forest Extension includes cooperative assistance in tree planting, the introduction and trial of exotic seed and plants, and the collection and distribution of island grown tree seed and seedlings. This work is carried on under the direct charge of Mr. David Haughs, the Forest Nurseryman. In Mr. Haughs' report will be found a statement of what has been accomplished during the year. It is unnecessary to summarize this report for it is not so long but that it may easily be read.

TREE PLANTING.

It may however well be noted here that the forest work carried on through the Section of Forest Extension is each year coming to have a larger place in the affairs of the Territory. The diminishing supply of wood and timber on the American mainland, the consequent rise in price of all wood products, the local need of wood suitable for fence posts, railroad ties, bridge timbers and the like, not to speak of general construction timber, and the necessity for a cheap fuel supply—that already in some districts is a serious problem—all point to the wisdom of tree planting.

All over the Territory are areas of waste land that can be made useful and productive by growing trees. These lands cannot profitably be used for any other crop. Under the conditions that obtain in Hawaii, forest planting is a good investment. Among the introduced trees are many quick growing species that yield wood and timber exactly adapted to local needs. The Division of Forestry stands ready to give expert advice as to what, where and how to plant to get the desired results. This advice is practically free—only the travelling expenses of the agent sent are charged to the applicant, and often even this charge is distributed among several applicants. During the past year the interest in tree planting has increased notably. It ought to continue steadily to gain, for there can be no question that those who today are thus turning to account the gulch sides and other unproductive corners of their land will in the coming years have reason frequently to be glad of their foresight.

SEED AND PLANT INTRODUCTION.

Another feature of the work in Forest Extention that deserves special mention is the introduction of exotic trees and shrubs of economic value to the Territory. The systematic exchange of seed, with the careful propagation and eventually the distribution of important introduced trees is one of the chief services rendered by this Section of the Division of Forestry. Hawaii is fortunate in having already secured among others such additions to its arborescent flora as the Algaroba, the various Eucalyptus, the Ironwoods, the Silk Oak and the Japanese Cedar. But there are other trees quite as valuable that have not yet been tried.

It is peculiarly the business of the Division of Forestry to carry on this work, for the seed and seedlings of many of the imported trees require to be handled with particular care, such as can only be given by technically trained men. At the Government Nursery are specially constructed propagating houses, where seed that it is difficult to grow can be given every advantage. Later, when the seedlings grow to be large enough to plant out safely, it is a part of the program of the Division of Forestry to see that each new kind goes to some place in the Territory where it is likely to do well—a matter depending on elevation, exposure, soil, and moisture. Through the cooperation of volunteer observers in different parts of the Territory much valuable information will in due course be got together as to the exact worth in Hawaii of the newly introduced trees. The past year is notable in that it marks the definite beginning of this work on a large scale.

A problem of great forest interest is the afforestation of the upper slopes of the higher mountains of the Territory with trees from the Temperate zones—preferable with conifers. Arrangements to begin experimental planting during the summer of 1907 had been made in cooperation with the United States Forest Service but owing to a ruling of the Comptroller of the United States Treasury, the project had to be abandoned. It is expected, however, that the plan can be carried out in 1908.

AN INFORMATION BUREAU.

Besides being charged with the execution of the two more important branches of Forest Extension—cooperative assistance in tree planting and seed introduction—Mr. Haughs has a large amount of detail to see to in connection with the routine work at the Government Nursery. The answering of inquiries on forest, horticultural, botanical and other kindred matters, the oversight of the propagation, sale and free distribution of the seed and seedlings of the trees in common demand, and the care of the herbarium and seed collections are all matters of importance. Special mention of them is made here because it is the desire of the Staff of the Division of Forestry that the people of the Territory shall know and make use of these opportunities. Persons desiring information on any subject germain to forest work will be assisted in every way possible. Application may be made in person or by letter. In either case requests will receive prompt attention.

MISCELLANEOUS FOREST WORK.

FOREST MANAGEMENT.

Besides cooperating with private owners in tree planting the Division of Forestry also stands ready in cases where the wise use of the forest is through commercial utilization, to advise owners of forest land as to proper methods of forest management. This work is done under the same terms that govern the preparation of planting plans; the offer is contained in Circular No. 1 of the Division of Forestry.

In 1907 the Superintendent of Forestry made two investigations of forest problems on the Island of Hawaii under this offer. Both were made at the request of the Trustees of the Bernice Pauahi Bishop Estate: in one case there was desired a report on the progress and methods of the Hawaiian Mahogany Lumber Company in the lumbering operations on the Bishop Estate land of Keauhou in Kau; in the other, recommendations as to the proper use, protection and development of the lands belonging to the Bishop Estate in the District of Kona. In connection with the other field work on Hawaii both problems were investigated on the ground, respectively in June and September 1907. A report on the former was submitted to the Trustees of the Bishop Estate in July; the report on the latter, due to a pressure of official work was still in preparation at the end of the year.

The report on the lumbering was an impartial statement of existing conditions, together with certain recommendations looking to the future welfare of the forest. The report on the Kona forest will contain a statement of the forest situation in that district, brief descriptions of the forest on the several lands belonging to the Estate, and suggestions as to how the forest could be maintained permanently and at the same time used wisely, through the conservative lumbering of the commercially valuable trees under the methods of practical forestry.

In Hawaii where a forest is not needed for stream protection, its chief value lies in the wood and timber it can produce. It follows that the wise use of that forest is so to manage it that it shall yield repeated crops of wood or timber. Where, as is the protection forests in the windward districts of Hawaii, the most valuable product of the forest is water, the wise use of that forest is so to manage it that it shall yield permanently the greatest possible regular supply of water. In both cases the object is to make the forest render the service for which it is best adapted.

A large part of the forest in Kona belongs to the commercial class. In Kona there are no permanently running streams and few springs. The need of the forest as a protective cover consequently gives place to its value as a source of wood and timber. Much of the land now under forest in Kona is of only slight value for other use. Properly managed it could be made to yield repeated crops of timber of excellent quality, commanding good prices. The purpose of forest management is to do just this. Therefore, forestry can and should be practiced in Kona. This is the gist of the recommendations to be embodied in the Bishop Estate Report.

During the examination of the Kona lands verbal recommendations, similar in tenor to those just outlined, were also made to members of the Greenwell Estate, on the care and management of certain of their forest land.

EDUCATION IN FORESTRY.

The ultimate success of forestry in Hawaii depends on the continued cooperation of individauls and private corporations with the Territorial Government. In a county where so much of the forest area is in private ownership it is essential that this relation be cordial and active. To promote a better understanding and to bring home to those controlling forest land the advantages of forestry, education becomes one of the necessary parts of forest work in Hawaii. It includes the general dissemination of information about the purposes and principles of forestry and the reasons why forestry is justly to be regarded as playing an important part in these islands.

Educational work in forestry is carried on by means of publications and by addresses delivered before various organizations. In 1907 the monthly journal issued under the direction of the Board, "The Hawaiian Forester and Agriculturist," has been the most important vehicle of publication. In this magazine appear the reports of the Superintendent of Forestry on forest reserve matters, with the recommendations of the Committee on Forestry and the resolutions of the Board in regard thereto, reports on the various phases of the routine work of the Division of Forestry, and numerous special articles on one and another forest subject. During the past four years it has been the custom in each forest reserve report to explain fully the reasons underlying the recommendations made. The object of this is to enable those reading the reports to get intimately in touch with the purpose and ideals of the work. Technical terms are so far as possible avoided and the attempt is made to present the essential facts in a clear and logical manner.

In July the Superintendent of Forestry prepared a statement to be included in the annual report of the Governor of the Territory to the Secretary of the Interior, and in November a paper on the progress of forestry in Hawaii during 1907, which he read at the annual meeting of the Hawaiian Sugar Planters' Association. This paper, with another delivered at the same meeting by Mr. L. A. Thurston, Chairman of the H. S. P. A. Forestry Committee, was later reprinted from the Hawaiian Forester and Agriculturist, as a separate, and distributed. Mr. Thurston's paper is a masterly presentation of the present forest situation in Hawaii. It is one of the notable contributions to the forest literature of Hawaii. It should be carefully read by every one who has to do with the care of forest lands in these islands. Copies may be obtained on application to the Superintendent of Forestry.

On February 28, 1907 there was issued the annual report of the Board of Agriculture and Forestry for the calendar year 1906. Besides the regular edition of 2500 copies of the full report, 500 copies of the Report of the Division of Forestry were struck off separately. The report was distributed widely in the Territory and to correspondents away from Hawaii.

FUNGUS DISEASE ON MAUI.

Note should be made of a fungus disease that is working serious damage in the forest in the Koolau District on the Island of Maui.

In March 1906, immediately after a severe Kona storm that did considerable damage to the forest, it was noticed that the Ieie vine* and the Ohia Lehua† trees were dying unaccountably. The trouble was confined to spots of varying size. Sometimes the vine succumbed first, sometimes the trees. The trouble was first reported by Mr. W. F. Pogue, the District Forester for the Koolau Section, in his annual report for 1906, under date of January 24, 1907. By April 1907 the existing spots had increased alarmingly and other new ones had appeared in different parts of the forest. There was no apparent cause and no logical relation in the distribution of the infected areas.

On receipt of this information, the Superintendent of Forestry tried to arrange to have Dr. N. A. Cobb, the Pathologist of the Hawaiian Sugar Planters' Association Experiment Station, visit Koolau. But Dr. Cobb was not able to make the trip before leaving the Territory.

The Superintendent of Forestry caused specimens from the diseased trees to be sent to Honolulu for identification of the trouble and, later, visited the area himself. In August, at his recommendation, Dr. H. L. Lyon of the Division of Vegetable Pathology of the Hawaiian Sugar Planters' Association Experiment Station was sent to Maui. Dr. Lyon made a preliminary examination of the forest and reported that the trouble was unquestionably of fungus origin, but that a much more extended examination would be necessary before there could be made a definite statement of the precise cause, or recommendations for feasible means of combatting the trouble. Shortly after this negotiations were begun as a result of which such a study may be undertaken under the auspices and at the expense of the Hawaiian Sugar Planters' Association. A thorough investigation by competent experts in vegetable pathology is essential, for it is a problem where the solution can only be reached after careful study by specialists.

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* *Freycinetia arnotti* Gaud.

† *Metrosideros polymorpha* Gaud.

In his annual report for this year, Mr. Pogue notes that the area affected now covers between 4000 and 5000 acres and that the trouble is still spreading rapidly.

One of the pressing needs in Hawaii is that there should be at the service of the people of the Territory a Vegetable Pathologist. Calls requiring the services of such an official are constantly recurring. The specialists at the Hawaiian Sugar Planters' Association Experiment Station are not available except to the plantations and then only for plant diseases affecting sugar cane. The demand is urgent: it should be met.

THE DISTRICT FORESTERS.

Changes in Personnel.

Since the last report several changes in personnel have occurred in the staff of the District Foresters, through change of residence, removal from the Territory and death. A corrected list of the gentlemen now serving as District Foresters will be found elsewhere in this report. To make it of greater use there are included one or two changes that occurred early in 1908, while this report was in preparation.

It is with deep regret that announcement is made of the death on January 13, 1908, of Mr. Frank Scott, District Forester for the District of Koolau, Kauai.

Owing to change of residence resignations have been received from Messrs. A. M. Nowell, Waialua, Oahu; T. S. Kay, North

Kohala, E. E. Conant, South Kohala, David Forbes, Hamakua, and Eric H. Edwards, South Kona, all on the Island of Hawaii.

As successors to the above named gentlemen the following Distrcit Foresters have been appointed:

Name	District	Date of Appointment
G. C. Watt,	North Kohala, Hawaii	April 6, 1907
A. W. Carter,	South Kohala, Hawaii	August 5, 1907
R. von S. Domkowitz,	South Kona, Hawaii	August 5, 1907
W. W. Goodale,	Waialua, Oahu	August 7, 1907
August Ahrens,	West Hamakua, Hawaii	August 12, 1907

Reports of the District Foresters.

In place of the custom followed in the earlier reports, of a formal contribution from each District Forester, it was decided this year to include the statements made by them in this part of the report. Opportunity was given each District Forester to note anything of special interest that had occurred during the year, or any event in local forest history that had not been recorded before. The replies received show that there is now a widespread interest in forest planting throughout the Territory, especially by the Sugar plantation Companies. The list of Sugar Plantations known to be actively engaged in tree planting is as follows:

LIST OF SUGAR PLANTATIONS IN THE TERRITORY OF HAWAII NOW ACTIVELY ENGAGED IN TREE PLANTING.

Name	Locality
Kauai.	
McBryde Sugar Company	Eleele
Koloa Sugar Company	Koloa
Grove Farm Plantation	Lihue
Lihue Plantation Company	Lihue
Makee Sugar Company	Kealia

Oahu.

Kahuku Plantation Company	Kahuku

Maui.

Wailuku Sugar Company	Wailuku
Hawaiian Commercial and Sugar Company	Puunene
Maui Agricultural Company	Paia

Hawaii.

Kohala Sugar Company	Kohala
Paauhau Sugar Plantation Company	Hamakua
Hamakua Mill Company	Paauilo
Hakalau Plantation Company	Hakalau
Pepeekeo Sugar Company	Pepeekeo
Honomu Sugar Company	Honomu
Hawaiian Agricultural Company	Pahala

On several of the larger Ranches forest planting is also going on; notably the Haleakala Ranch on Maui; the Parker, the Horner, and the Kapapala Ranches on Hawaii; the Honouliuli and the Maunawili Ranches on Oahu; and the American Sugar Company's ranch on Molokai.

On Kauai the work done by Mr. Walter D. McBryde should in particular be noted, for thanks to him not only is tree planting going on on his own lands but also on that of many of his neighbors, in the homesteads and elsewhere.

The following extracts from the reports of the District Foresters are printed here as being of general interest or of importance as a matter of record.

Geo. H. Fairchild—Puna, Kauai.

"The Makee Sugar Company has been planting on its fee simple, side-hill lands and about its laborers' camps the following trees."

Ironwood trees	1498
Koa trees	500

Monkey Pods	300
Japanese Plums	643
Mango trees	50
Alligator Pear	45
Keawi	50
Kukui	100
Strawberry Guava	20
Camphor	100
	3306

"This year it intends to plant about 10,000 Ironwood trees along the windward side of its makai cane fields, bare side-hills and gulches."

Reverend J. M. Lydgate—Kona, Kauai.

Mr. Lydgate sends a memorandum of trees planted in the Koloa District as follows:

McBryde Sugar Company	20000
Koloa Plantation	8000
Scattering	2000
	30000

John Herd—Koolaupoko, Oahu.

"I beg to submit a report on Forestry conducted on the Maunawili Ranch during the calendar year 1907.

"*Trees Planted Out During Above Period*:

Albizzia Moluccana	350	trees.
Grevillea Robusta	345	"
Olives	43	"
Rubber (Hevea, Ceara & Castilloa)	512	"
Total	1250	

"Further large plantings of Rubber trees have since been made and will be continued from time to time.

"We have cut down and destroyed by fire over five hundred dead or dying Alligator Pear trees. These were all matured trees which had evidently been first attacked by a root fungus. Although an interested observer would at the outset have taken these Alligator Pear trees to be in a healthy condition they were far from being so on account of the root fungus attack before mentioned. Numerous small borers attacked the trunks and larger branches just as soon as the trees showed any sign of being unhealthy or in a fit condition for their depredations, eventually killing them outright in the course of a few months. We have altogether planted out on this Ranch 4,627 Alligator pear trees and it looks at the present time as if we might eventually lose the entire lot, even three year old trees being attacked by the disease and the borer.

"Our coffee crop has for a number of years been attacked by a black fungus which destroys the berry while ripening, causing a loss of over twenty-five per cent; this season the fungus has not spread as in former years. The introduction here through the Board of Agriculture of a small parasite which has destroyed the eggs of the Torpedo bug in large numbers was supposed by me to be the reason for the disappearance this year of the berry fungus in question, as the Torpedo bug when in large numbers appeared to attack the coffee berry as well as the leaf. Whether or not my supposition is correct the fact remains that the Torpedo bug has diminished to an enormous extent because of the attack of its egg parasite above referred to. The parasite referred to was I believe introduced from Australia into Hawaii by Prof. Koebele about two or three years ago for the specific purpose of destroying the eggs of this torpedo bug."

W. F. Dillingham—Ewa, Oahu.

"The John Ii Estate is doing some tree planting on the upper lands near their mountain house. The Hawaiian Pineapple Company is making ready to plant about twenty acres of land in upper Waipio and not far from the mountain house of the Ii Estate. This planting will consist principally of Eucalyptus Globulus, Eucalyptus Robusta and Eucalyptus Rostrata. While this above referred to planting is experimental in nature, the wood will be used in time for supplying the pineapple camps with firewood.

"Along the westerly slopes of the Koolau Range on the lands owned by and under lease to the Oahu Railway and Land Company the forest is making slow but steady growth of new trees. The ridges in this locality are practically impassable half a mile above the mountain fences due to the underbrush, thick rice and hilo grass and young trees, all of which together give the ground a covering which is a step in the right direction.

"Along the Waianae Range very good results are observed for the year 1907. The dying off of the lantana, however, has opened up a large tract of mountain land, which had practically fenced off the cattle from the young forest which was strating up above the lantana belt. Forestry work is being continued by the Railway Company along the tops and slopes of the south-westerly end of the Waianae Mountains, several thousand new trees having been set out this winter. A good growth of young Koa is coming up from old roots. The Algaroba, which has always been considered a low land tree, is spreading towards the mountain top and on the higher elevations seems to have changed in character so as to now grow with thrift at a height of 1500 feet. The south-westerly slopes of the Waianae Mountains are rapidly being covered by this growth of trees.

"A systematic hunting of goats on the Waianae Mountains has resulted in the saving of considerable old forest cover. In this connection I have to say that it would be a most advantageous move to have the goats driven or hunted off all of the lands extending to the mountain tops as the driving of the animals from the Railway lands means devastation of the adjoining lands to which the goats go.

"I am pleased to report that there have been no forest fires in the district during the year 1907. More and more interest is shown in the cause of reforesting the mountains by the land owners of this district."

Andrew Adams—Koolauloa, Oahu.

"Appreciating the probable shortage of lumber in the future, Kahuku Plantation Company is systematically planting Hau in the fences by placing Hau cuttings at points equidistant from the fence posts in the line of fence, so that when the present fence posts become useless the wires can be attached direct to the Hau bushes. This, of course, serves a double purpose and presently the line of fence along the government road through the plantation will be filled with Hau trees. This is being done not only along the government road but along the entire line of plantation fences."

Mr. William F. Pogue—Koolau, Maui.

"The death of the forest trees, caused by some, as yet unknown disease, has spread very rapidly, the estimated area being between 4000 and 5000 acres, and the destruction of the live forest in this district continues even more rapidly than a few months ago. Unless something is found to prevent this epidemic before long, it will only be a few years before the original forest trees here will be extinct."

Mr. L. von Tempsky—Makawao, Maui.

"There have been planted on the Haleakala Ranch during 1907, between thirteen and fourteen thousand trees; all (with the exception of 850 which outline a fence) in plots, varying from one to thirteen acres.

"I am planting exclusively the seeds of valuable Eucalypti, such as E. Amygdalina, Botryoides, Corymbosa, Corynocalyx, Leucoxylon, Paniculata, Rudis, Gunii, Siderophoia, Sieberiana, Polyanthemos and Rostrata; all of these are trees of known value for fence posts, railroad ties, bridge and wharf timbers.

"I find the Botryoides the most rapid grower, equalling, and in some cases beating the Globulus. As this species ranks very highly in Australia for railroad ties, I am sure that one cannot go very far wrong in planting lots of it. Next in rapidity of growth comes the Rudis, which seems entirely suited to Makawao soil and climate. I am experimenting with cost of tree growing under different conditions. In one case I have planted a measured acre, furrowed and kipikuaed* only; immediately adjoining it, is a plot of three acres, plowed, harrowed, and the soil thoroughly prepared. In both cases identically the same species are planted, in two or three instances half a box of trees would be planted in the one acre lot, and the other half in the three acre piece; the effort being made to have the specimens in both lots as nearly alike in size and vigor, as possible.

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* Kipikua is the local name for pick-mattock.

"At present the difference in growth of the two lots is wondedful, the cultivated trees being more than three times as tall as the uncultivated; at the present age of these trees (six months) some of the Botryoides measure 7 ft. 3 in. high, the Rudis 6 ft. 6 in. A stray Globulus that managed to get in one of the boxes and was planted measures 6 ft. 3 in. I am keeping careful figures on the cost of these two lots, and will be able to give you some data as to the difference between the two styles of cultivation next year.

"In order to reduce the cost of the three acres, I have planted between the tree rows (which are six feet apart) Irish potatoes, and with any luck at all, I will probably clear the outlay expended on both the trees and potatoes; and as the potatoes are being constantly hoed and hilled up I believe that the stirring of the soil will stimulate the tree growth sufficiently to offset any detriment that may be caused by the use of the soil.

"During the past year I cut 244 good fence posts, five to twelve inches in diameter, from 38 second growth Eucalyptus Rostrata trees, twelve years old. Some of these posts have been put in the ground plain and the balance subjected to Creosote treatment by the Kahului Railroad Company. All of these posts will have the date stamped on them, and the place of use recorded in the ranch forestry book; so that it can be ascertained accurately their respective life in the ground."

Mr. George C. Watt—North Kohala, Hawaii.

Mr. Watt reports that the Kohala Sugar Company has been planting up its waste land and gulches, principally with Ironwood (*Casuarina equisetifolia*).

Mr. John M. Ross—North Hilo, Hawaii.

Mr. Ross reports the planting of a wind-brake along the bluff by the Hakalau Plantation Company; considerable tree planting by the Homesteaders on the different settlement association tracts, both at Hakalau and Honomu; and the planting by the Pepeekeo Sugar Company of about ten acres of Pride of India trees.

Mr. J. Watt—Puna, Hawaii.

"It may not be out of place to mention here that a small area of forest land in Puna has been cleared and planted to Rubber by a Company of Honolulu men. I have not seen the trees but I am informed that they are growing well.

"The Hawaiian Mahogany and Lumber Company are erecting a saw mill near the Pahoa station in connection with the lumbering operations which they are to carry on on the lands of the Puna Sugar Company. So far they have not cut any trees but expect to do considerable work during the present year. All of the land to be lumbered by the above company will be planted to cane."

Mr. J. A. Maguire—North Kona, Hawaii.

Mr. Maguire calls attention to the increasing interest that is being taken in North Kona due to the establishment of the Hawaiian Development Company in that District.

THE WILD BIRD LAW.

Pursuant to Act 104 of the Session Laws of 1907, "to provide for the protection of birds beneficial to the forests of the Territory of Hawaii," thirty-five of the District Foresters were commissioned as Special Territorial Police Officers by the High Sheriff of the Territory. Those so appointed are designated by a star (*) in the list of District Foresters.

The full text of the Bird Law is given on another page of this report. As a matter of record it may here be noted that Prof. H. W. Henshaw, now of the Bureau of Biological Survey of the United States Department of Agriculture at Washington, but for some years a resident of this Territory, has suggested that this law should be so amended as specifically to cover the Hawaiian Goose (Nene). Dr. Henshaw says, "If there is any Hawaiian bird that deserves special protection it is the Hawaiian Goose, both because it is unique, it having no near relative elsewhere in the world, and because of its economic importance as food." The law should be amended to include it.

TANTALUS AND NUUANU FORESTS.

It may be noted that the Coney Estate lands on Tantalus Heights, Oahu, on which is the greater part of the planted Eucalyptus forest, passed to the Territory as a part of the Lanai Exchange. But as the Lanai case has not yet finally been settled by the Courts, the Government has refrained from taking active control. By agreement with the Superintendent of Public Works the management of the Forest on Tantalus is turned over to this Department. At present the care given consists mainly in the protection afforded by the presence of the Forest Ranger. Tantalus Forest and Tantalus Heights are really to be considered as a Forest Park. Consequently among the other duties of the Forest Ranger are the keeping open of old trails and the construction of new ones. Trails would facilitate the fighting of fire should one ever happen to occur: they add much to the enjoyment of Tantalus as a park.

During the year the Division of Forestry has continued to keep men in upper Nuuanu Valley to look after the young trees and to do other necessary work. The Nuuanu Forest plantations continue to thrive and increase in value and attractiveness.

FOREST FIRE SERVICE.

Hawaii has been fortunate during the past year in the absence of meteorological conditions favorable to forest fire. The presence on the statute books of the present forest fire law has doubtless also had something to do with the small number of fires. Fire warning notices in different languages are posted generally throughout the Territory, and many of the District Fire Wardens have been active in calling to the attention of the people in their districts the penalties provided where injuries result to the forest from the careless use of fire.

PERIODS OF FOREST FIRE DANGER.

Special periods of forest fire danger were proclaimed in two cases, under the authority of Section 6 of Act 71 of the Session

Laws of 1905, as follows: For Tantalus Heights, Oahu; twelve months from February 9th, 1907; and for a portion of the District of Waialua, Oahu, six months from March 19, 1907, number of permits to burn brush, eleven.

On Tantalus Heights, Oahu, because of the great danger resulting from the large number of persons visiting the forest, a special period of twelve months is annually declared in February. During the year thirty permits to burn brush were issued by the District Fire Warden in charge, Mr. W. M. Giffard. One of the important duties of the Forest Ranger on Tantalus is to see that the work authorized in these permits is properly done.

RECORD OF FIRES.

Three small brush fires, all of which were promptly extinguished, were reported to the Chief Fire Warden during 1907. The record is as follows.

May 30, *Waiakea, Puna, Hawaii.*

Grass fire. Area burned over, about 100 acres. No damage; but had the fire not been stopped it would probably have reached the forest, with serious consequences.

At the request of the District Fire Warden, Mr. J. A. Scott, the Deputy Sheriff, Captain Fetter, turned out the prisoners in the Hilo jail and extinguished the fire. It was impossible to secure any evidence as to the persons who set the fire.

June 30, *Nuuanu Valley, Honolulu, Oahu.*

Brush fire on the Waikiki side of Nuuanu Valley, opposite the Forester's cottage. Area burned over, about 15 acres. Damage slight. This fire was extinguished after five and a half hours hard work by the Deputy Fire Warden for Nuuanu Valley, Mr. G. H. Moore, assisted by his daughter Mary, and one laborer.

Summer, 1907, Koolauloa, Oahu.

Mr. Andrew Adams, the District Fire Warden, reports one brush fire, resulting from the careless use of fire, in the clearing of land. The fire was stopped before any real damage was done.

Lack of Money for Fighting Forest Fires.

The Department is seriously hampered in its efforts to combat forest fires by the absence of any fund from which fire fighters can be paid. This past year the Territory has been fortunate in generally favorable climatic conditions. Next year there may be a long drought. Provision should be made for a fund that could be drawn on should an emergency arise. An effort to secure such a fund will again be made at the next session of the Legislature.

FORESTRY IN GENERAL.

Outside of the forest work carried on by the Territorial Government and of the tree planting on the Sugar Plantations—of which mention has already been made—there are to be noted the following facts of forest interest in Hawaii during 1907.

THE LUMBER INDUSTRY.

Hawaiian Mahogany Lumber Company.

The development of the Hawaiian lumber industry stands out preeminent, through the signing in October 1907 of a contract between the Hawaiian Mahogany Lumber Company and the Santa Fe Railway System to supply during the next five years ninety million feet, board measure, of Ohia Lehua railroad ties; eighty million feet in the form of 500,000 standard ties annually, and ten million feet in 2,500 sets of switch ties.

In September 1907 Mr. E. O. Faulkner, Chief of the Bridge and Tie Timber Department of the Santa Fe Railway came to Hawaii on his way around the world in the interests of his company. The contract was signed after a visit to the forests on the Island of Hawaii. This contract is far reaching in its effect for it introduces our Ohia timber to the mainland market. Once known it cannot in the furture ever wholly be lost sight of, especially with the growing demand for hardwood timbers of the better sort.

Most of the ties for this contract will be cut in the Puna District on the homestead lots above Olaa, on lands of the Puna Plantation that are being cleared for cane, and on other lands in Puna on which rubber will be planted. The ties will be shipped from Hilo by steamers and sailing vessels, the first shipment being some time in the spring of 1908.

Prior to this contract—in June 1907—one schooner load of 13,000 Ohia ties was sent to San Francisco. Several good sized orders for Ohia ties and Ohia piling for use in the Territory have also been filled by the Hawaiian Mahogany Lumber Company.

In its work with Koa the Hawaiian Mahogany Lumber Company is progressing slowly. A narrow gauge railroad is being built from Glenwood to the saw-mill in the woods back of the Volcano House, the mill itself has been erected and some of the machinery installed. Some 200 or 300 large Koa trees have been felled, cut into logs and hauled in to the mill yard. The practice of pulling the trees over by cable and donkey engine, instead of felling them is the usual way with ax and saw, has been proved practicable. This is an important point to have settled, as this method will result in a saving of waste at the butt which when the log is sound, is the most valuable part of the tree. If the program outlined by the Company is carried out a considerable quantity of high grade Koa lumber should soon be on the market.

American-Hawaiian Mahogany Lumber Company.

The operations of the American-Hawaiian Mahogany Lumber Company in South Kona are also slow in developing. A well built wagon road has been constructed from the Buchholtz Place up to the Logging camp in the Koa Belt, which permits the hauling of logs by wagon to the landing at Hoopuloa. One shipment of Koa logs, of approximately 30,000 feet, board measure, was made in October 1907. The logs went by schooner to the Company's mill at Petaluma, California. No Ohia has been cut by this Company.

Hawaiian Development Company.

Mr. J. B. Castle, under the name of the Hawaiian Development Company, has large plans for the general economic development of the Kona District. A railroad is projected, connecting at Kaawaloa Point with ocean going steamers that can tie up to a wharf to be built in deep water. To provide an immediate supply of freight for the new railroad it is proposed that extensive lumbering, both of Koa and of Ohia be begun in the Kona forests. As a result options have already been secured on several tracts. Other applications are pending, among them one from Mr. Castle for such stumpage on all the Government forest lands in the Kona district as the Territory may be ready to sell under restrictions looking to the continued welfare of the forest.

The options that have been given so far provide that the lumbering be done in accordance with the methods of practical forestry: the other large private owners and the Territorial Government will protect their interests still more carefully, in any contracts that may later be made.

As has already been pointed out in this report large areas in the forest of Kona and Puna belong to the commercial forest class, where the wise use of the forest is judicious exploitation. Under scientific management the Hawaiian forest of this class can be made to yield repeated crops of wood and timber, while being constantly improved in quality. Much of the upper land in Kona is unsuited to raising any crop but trees well. If it is used for other purposes say for grazing, it is at best of only indifferent value. This makes it obvious that as the Kona forest is not needed to protect water sheds it should be turned to economic account in some other way. Therefore, provided that the lumbering is carried on in accordance with the methods of forestry, its advent as an industry in Hawaii is heartily to be welcomed.

RUBBER.

Another sign of much promise in Hawaii is the steady development of Rubber as an industry. It is true that until systematic tapping tests, conducted at Nahiku, show that the latex flows in sufficient quantity to permit it to be collected at a profit, the industry will still be in the experimental stage. But there is every indication that the outcome will be successful. The trees grow well and it is reasonable to expect that ordinary difficulties in regard to methods of tapping and cultivation can be overcome. The summer of 1908 will see such tests regularly begun at Nahiku.

On October 12, 1907, there was organized at Nahiku, Maui, the Hawaiian Rubber Growers Association. A good sized company of people went over from Honolulu on a special steamer; the four Maui rubber plantations were visited; and at the dinner following the organization of the Association, papers were read and speeches made by various men prominent in the Territory. The object of the Association is to bring the Hawaiian rubber growers together and in general to advance the industry.

In October 1907, Mr. F. T. P. Waterhouse started on a trip to inspect the rubber plantations in the Malay Peninsula. In order that he might also visit Ceylon, Mr. Waterhouse was appointed a Special Agent of the Board of Agriculture and Forestry, a portion of the expenses of the trip being paid by the Territory. As a result the Board will secure a report on the methods of growing and harvesting rubber in use in those countries, that cannot but be of much value. The report will of course be published in due time.

COCONUTS.

The manufacture and shipment of a considerable quantity of copra from the Island of Kauai, the organization of a company to start a coconut plantation on the windward side of Oahu, and the planting of numerous small groves on the other islands all point to the development of a coconut industry. The Hawaiian islands lie just at the northern edge of the zone in which the coconut will thrive, but the demand for coconut products—coconut oil, copra, and coir—is so great that the outlook is full of promise. In Hawaii it takes from seven to ten years for a coconut grove to come into bearing, but as this group of islands is free from the severe storms that at intervals do so much damage in the South Seas, Hawaii is able to compete successfully with regions more favorably located for coconut growing.

ARBOR DAY.

Arbor Day has now become a recognized festival in the schools of Hawaii. This year, Friday November 15 was the day appointed by the Governor. This date is a better one than the first Friday in November, because it removes the possibility of conflict with the Japanese Emperor's birthday—a date of considerable significance locally, on account of the large proportion of Japanese children in the Hawaiian public schools—and because it brings the planting a little more directly under the favorable influence of the winter rains.

THE OUTLOOK FOR 1908.

An annual report necessarily consists largely in a retrospect of past endeavor. It is a record of things accomplished or, at least, actually begun. It should also contain an outline of future work.

During 1908 it will be the aim of the Division of Forestry to bring to completion and final setting apart practically all of the large forest reserves that are needed to establish the main chain of the forest reserve system throughout the Territory.

An earnest effort will be made to encourage further and on a larger scale than at present, tree planting on waste land by private individuals and corporations.

The work of introducing new trees of economic value will be continued; the distribution of the exotic plants now being propagated will be begun. Assurances have been received from the United States Forest Service that in 1908 provision will be made for cooperation between that Bureau and this Territory in experimental tree planting on the upper slopes of the high mountains. It is hoped that this important work can surely be started during the coming year.

In anticipation of the next Session of the Territorial Legislature steps will be taken to secure favorable action on an increase in appropriation sufficient to provide for the fencing of certain forest reserve boundaries, for the employment of forest rangers, and for a fund for use in emergency, for combatting forest fires.

There are many forest problems waiting to be attacked in Hawaii. A thorough investigation of the areas of planted forest throughout the Territory would yield an immense amount of valuable information as to the rate of growth, amount of wood produced, and relative worth of the introduced trees. A detailed study of the habits of the Native Hawaiian trees would from the basis for perfecting the most efficient methods of handling the forest reserves. The repeated observation, at intervals, of given tracts that have been lumbered, or burned over, or fenced off from cattle would throw additional light on the difficult problem of how to put all of the forested area of Hawaii to its wisest use.

These are some of the opportunities for service that lie before the Division of Forestry. The year 1907 has seen the establishment under auspicious conditions of several enterprises of importance in the forest history of Hawaii. The year 1908 should show long steps of progress in the development of these and other forest projects.

Very respectfully,
RALPH S. HOSMER,
Superintendent of Forestry and
Chief Fire Warden.

Report of the Forest Nurseryman.

Honolulu, Hawaii,
December 31, 1907.

Ralph S. Hosmer, Esq.,
Superintendent of Forestry,
Honolulu, Hawaii.

Dear Sir:—

I herewith submit a report of the work done at the Government Nursery, the Nuuanu Station and the Tantalus Forest, including the giving of advice and assistance and other matters, for the year ending December 31, 1907.

THE NURSERY.

COLLECTION AND EXCHANGE OF SEED.

The collection of seed has been continued throughout the year and one man has been kept busy collecting and making up packages for exchange purposes. Our seed exchange list now numbers 110. In opening communications regarding the exchange of seed a circular letter was drawn up and forwarded to 110 addresses, including all the known Botanic Gardens in different parts of the World, also a number of Forest Departments, Experiment Stations, Parks, and other Institutions. The full list is given on another page of this report.

To each was sent sample packages of seed collected in the neighborhood of Honolulu. The average number of packages sent to each was about 50, representing as many species and varieties. Altogether 5453 packages were sent out. In exchange for seed sent out we have already received 925 packages, a large number of which are new to the Islands.

From the Botanic Gardens, Dahlem, Berlin, Germany we received two new kinds of rubber bearing Manihot; one described as coming from Jequie and the other from Piauhy, Brazil. About 25 plants of each kind were raised from the seed received; these are doing well.

A large number of plants new to the Territory are being raised from the seed received, and a piece of ground is being prepared in Makiki Valley for the purpose of experimenting with them. The plants that are found to be of value and grow well will be increased by seed and cuttings and in time distributed to people who guarantee to take good care of them. Mr. Marston Campbell, Superintendent of Public Works, kindly granted the Board the use of the land upon which the new plants are to be tried.

CONGRESSIONAL VEGETABLE SEED.

The usual consignment of vegetable seed was received from the Honorable J. K. Kalanianaole and distributed to people all over the Territory, including all the public and private schools. A large number of homesteaders and others applied for seed by letter and quite a number called at this office in response to a free advertisement in the local newspapers.

GROWING AND DISTRIBUTION OF PLANTS.

Owing to the large quantities of seed of new plants which we are receiving through the exchange system, it was found that the small propagating house was not large enough for the work. A new propagating house the same size as the other one was accordingly built. Both houses are fitted up with ant-proof supports made of concrete. Another feature of the houses is a new system of watering from the bottom. This is done by means of zinc covered benches made in the shape of a large tray, the dimentions being four inches deep and three feet by fifteen feet. Each house has two benches with a three foot gangway between. A faucet is placed at one end of each bench to supply the needed water. At the other end a ¾ inch pipe is connected with a groove which runs along the center from the one end to the other. There is a gradual fall of about one inch on the groove, the bench otherwise being level. This system of watering works exceedingly well and better results have been obtained since its inaguration than we have had at any time in the past.

The following is the number of plants given away, sold, and sent out for Arbor Day planting—also gratis—to Homesteaders, Improvement Clubs, Schools, Parks and others.

	Forest	Fruit	Ornamental	Total.
Gratis	2982	580	4102	7664
Arbor Day	654		870	1524
Sold	7050	310	3555	10915
	10686	890	8527	20103

In addition to the above, 5,000 Para rubber (*Hevea brasiliensis*) trees were propagated from seed for the Castle Estate and 3,000 of the same kind for Maunawili Ranch.

REALIZATION.

During the year there has been collected and deposited with the Treasurer of the Territory, as a Government realization, the sum of $347.15. The amount is itemized as follows:

Sale of plants	$263.00
Sale of seed	28.20
Receipts for fumigating plants (Division of Entomology)	14.95
Receipts for Insect Boxes (Division of Entomology)	40.50
Rebate on Post Office Box	.50
	$347.15

RUBBER.

During the month of June, 186 Central American Rubber Plants (*Castilla lactiflua*) were distributed. These were raised from seed received from Ceylon. Twenty-five people were selected on the different Islands who agreed to plant and take care of the trees. As a matter of record a list of those to whom these rubber trees were sent follows this report.

In addition to this about 300 trees of the same kind were raised. The seed from which they were propagated was brought from Mexico by Mr. G. R. Ewart and propagated for him at the Nursery. At the request of Mr. Ewart a circular letter was drawn up, and a copy sent to each of the plantation managers. The letter stated that a limited number of plants could be had by applying for the same at this office. A large number of the managers took advantage of this offer and sent for plants.

Ceara Rubber.

Favorable reports have been received from a large number of people in different parts of the Islands regarding their success with the seed of the Ceara Rubber (*Manihot glaziovii*) sent out from this office for experimental purposes, during the months of June and July 1906. One hundred persons were selected to take up the work of experimenting with this Rubber on the different Islands of the group. A great many of these have made favorable reports regarding the growth and healthy condition of the trees.

NURSERY GROUNDS.

Considerable work has been done in improving the Nursery Grounds. A large quantity of soil has been carted in to fill up to grade the low lying part in the center, about 3000 yards of soil being required. The walks have also been filled up to grade with coral rock. Redwood curbing has been laid along all the walks. Through the kindness of Mr. C. S. Holloway, the then Superintendent of Public Works and Mr. Marston Campbell, the present Superintendent of Public Works, enough soil for filling purposes has been secured and delivered at the Nursery without cost to the Board. We are also indebted to Sheriff Henry for his kindness in allowing us the use of two prisoners. the prisoners have worked exceedingly well and we have had no trouble whatever with them.

ADVICE AND ASSISTANCE.

HAWAII.

Puna Sugar Company.

Examination and report on two tracts of land in the District of Puna, belonging to the Puna Sugar Company and known as Kamaile tract and Keahealaka tract.

The visit and examination was made at the request of the agents of the Puna Sugar Company and was for the purpose of studying on the ground the local conditions in regard to the advisability of starting rubber planting on a large scale. The planting of experiment plots at different elevations with the following rubber trees was recommended. Para rubber (*Hevea brasiliensis*), Central American rubber (*Castilla lactiflua*) or (*Castilloa elastica*), Ceara rubber (*Manihot glaziovii*).

OAHU.

Waialee Industrial School.

A report with recommendations on the reforesting of certain lands belonging to the Industrial school at Waialee, Oahu.

The examination was made at the request of T. H. Gibson, Superintendent, and was for the purpose of making recommendations in regard to the best trees to plant, methods of planting, etc. Recommendations were made with a view to the needs of the institution as regards trees for firewood, fence posts, etc.

Waialua Plantation.

Report with recommendations on the reforesting of part of what is known as Kawailoa Tract, belonging to Waialua Plantation.

The examination and report was made at the request of Mr. W. W. Goodale, Manager, and was for the purpose of studying the local conditions in regard to tree planting of a 2000 acre tract. Black Wattle (*Acacia decurrens*) was recommended for this tract.

Catholic Mission Lands in Kalihi Valley.

Report with recommendations in regard to the planting of forest and other trees on a tract of land in Kalihi Main Valley, belonging to the Catholic Mission.

The examination and report was made at the request of Bishop Libert and was for the purpose of giving advice on the planting of forest and other trees best suited to the needs of the institution. A number of trees were recommended.

Wahiawa Water Company.

Report with recommendations on the removing of dead trees and the replanting of a tract of land at Wahiawa.

This tract is part of the forest which was destroyed by fire during the month of March, 1905. The Wahiawa Water Company lease the water rights on this land and their main ditch runs through it. A planting plan was drawn up for this tract. The examination and report was made at the request of the Agents of the Company.

Hawaiian Fibre Company.

Report with recommendations on the planting of trees on certain lands lately acquired by the Hawaiian Fibre Company at Lower Pouhala.

The examination and report was made at the request of Mr. Wm. Weinrich, Manager, and was for the purpose of making recommendations in regard to the planting of trees in the gulches and other land not wanted for sisal growing. A number of trees producing valuable timber were recommended.

Waianae Uka, Ewa District.

Report with recommendations on a tract of forest land known as part of the burned section of Waianae Uka, Ewa District; and in regard to the removing of dead trees and planting with other trees.

The examination and report was made at the request of the Agents of the Dowsett Company and was for the purpose of making recommendations regarding the removing of the dead trees on the tract and planting with other trees. A plan similar to the one made for the Wahiawa Water Company was recommended.

MAUI.

Kaupo, Maui.

Report with recommendations on certain tracts of land belonging to Mr. D. B. Murdock and Mr. E. E. Paxton in the district of Kaupo, Maui.

The examination was made at the request of Messrs. Murdock and Paxton and was for the purpose of making recommendations regarding the advisability of using the tract for rubber or other industries.

After a thorough examination of the tract the growing of pineapples was recommended as the principal crop. In the gulches patches of limes and oranges were recommended.

IN AND AROUND HONOLULU.

The number of people in and around the city who have asked for advice and assistance has been larger during the year than at any time in the past. Forty-five visits have been made and a large number has called at this office. The nature of advice and assistance asked for principally concerns the planting and care of trees, pruning, preparing of the soil for seed raising and so forth.

NUUANU STATION.

The condition of the forest is exceedingly good. Since the last annual report the increase in the growth of the trees is very noticeable. The two men at the station have spent most of their time in fighting the vine, Maile Pilau. This work will require to be kept up and if possible not only the planted part attended to but the larger trees of indigenous growth, such as Koa, Kukui and Ohia growing higher up the slopes. An effort will be made during the coming year to clear this vine from all trees of any value.

TANTALUS FOREST.

The Tantalus forest is also in good condition, the trees being healthy and growing well. The Ranger, David Kapihe, has done good work in clearing trails and looking out for fires. No sales have been made. The percentage of trees that have died is very small.

Respectfully submitted,
DAVID HAUGHS,
Forest Nurseryman.

LIST OF PERSONS TO WHOM WERE SENT EXPERIMENTAL LOTS OF CENTRAL AMERICAN RUBBER.

(*Castilla lactiflua*)

	Number of Plants
Hind, R. H., Puuwaawaa Ranch, Kawaihae, Hawaii	6
Holstein, Hon. H. L., Kohala, Hawaii	6
Iten, Henry, Mountain View, Olaa, Hawaii......	6
Lee, Peter, Kurtistown, Olaa, Hawaii	6
Loebenstein, D. A., Wainuinui, Puueo, Hilo, Hawaii	6
Lyman, Henry, Kapoho Ranch, Puna, Hawaii....	6
Lyman, L. C., Hilo Boarding School, Hilo, Hawaii	6
Matthias, Brother, St. Mary's School, Hilo, Hawaii	6
McDougall, Geo. W., Hookena, Kona, Hawaii......	6
Paris, Hon. J. D., Kealakekua, Kona, Hawaii.....	6
Snow, Frederick, Mountain View, Olaa, Hawaii...	6
Domkowitz, R. von S., Hoopuloa, Kona, Hawaii...	6
Webster, Frank L., Pahoa, Hawaii..............	12
White, T. C., Kealakekua, Kona, Hawaii.........	6
Gay, Francis, Makaweli, Kauai	6
Hudson, C. W., Wainiha, Kauai	6
McBryde, Walter D., Koloa, Kauai	6
Wilcox, Hon. G. N., Lihue, Kauai	6
Anderson, W. A., Nahiku, Maui................	12
Austin, C. J., Nahiku, Maui	24
Howell, Hugh, Nahiku, Maui	12
Pogue, W. F., Huelo, Maui	6
Searle, R. C., Honolua, Maui	6
Munro, James, Molokai Ranch, Molokai	6
McVeigh, Jack, Leper Settlement, Molokai	6
Total	186

EXCHANGE LIST.

INTRODUCTION OF EXOTIC SEED AND PLANTS.

United States.

Arnold Arboretum, Jamaica Plain, Mass.
Botanical Gardens, Pennsylvania Avenue, Washington, D. C.
Botanical Laboratory and Garden, Johns Hopkins University, Baltimore, Md.
Briton, Dr. N. S., Director New York Botanical Garden, Bronx Park, N. Y.
Desert Laboratory, Tucson, Arizona.
Franceschi, Dr. F., Santa Barbara, California.
Goodale, Dr. George Lincoln, Director, Harvard Botanical Gardens, Cambridge, Massachusetts.
Gray, Robt. M., Superintendent Harvard Experiment Station, Soledad, Cienfuegos, Cuba.
Office of Seed and Plant Introduction, U. S. Department of Agriculture, Washington, D. C.
Trelease, Dr. Wm., Director, Missouri Botanical Gardens, St. Louis, Mo.

Foreign Countries.

A.

Curator, Botanical Station, Uganda, British East Africa.
Dunga Experiment Station, Zanzibar, British East Africa.
Imperial Biological Agricultural Institute, Amani, Port Tonga, German East Africa.
Director of Agriculture, Zanzibar, German East Africa.
Botanical Station, Alburi near Accra, Gold Coast, Africa.
Natal Botanical Garden, Durban, Natal, South Africa.
Botanic Gardens, Sierra Leone, West Africa.

Museo de la Plata, Buenos Ayres, Argentine Republic.
Jardin Botanique de la Univ. de Cardoba, Argentine Republic.

Botanic Gardens, Port Darwin, Australia.

Dixon, Hugh, Esq., Abugeldu Summer Hill, Sydney, New South Wales, Australia.

Forest Department, Sydney, New South Wales, Australia.

Staer, J., F.L.S., Nurseryman and Seeds-man, Wahroonga, New South Wales, Australia.

Bailey, Dr. Frederick Manson, F.L.S., Colonial Botanist, Brisbane, Queensland, Australia.

Bartels, O., Brisbane, Queensland, Australia.

Acclimatization Society Gardens, Brisbane, Queensland, Australia.

Botanical Gardens, Brisbane, Queensland, Australia.

Botanical Gardens and Government Plantations, Adelaide, South Australia.

Suehmann, Dr. J. G., Government Botanist, Melbourne, Victoria, Australia.

Woods and Forest Department, Perth, West Australia.

B.

Jardin Botanique, Brussels, Belgium.

Botanical Station, Bermuda.

Jardin Botanico, Rio de Janeiro, Brazil.

Botanical Gardens, Sao Paulo, Brazil.

Public Gardens, Rio de Janeiro, Brazil.

Museo Parence de Historia Natural, Para, Brazil.

Baker, C. F., Esq., Curator Herbarium and Botanical Gardens, Museo Goeldi, Para, Brazil.

C.

Superintendent Gardens and Public Parks, Cape Town, Cape Colony.

Royal Botanical Gardens, Peradeniya, Ceylon.

Jardin Botanico Y Catedraties de la Univ. Ydal Inst. Naceonal, Santiago, Chili.

Botanic Gardens, Hongkong, China.

Director of Agriculture, Forests and Commerce, Hanoi, Cochin China.

Botanical and Afforestration Department, Botanical Gardens, Hongkong, China.

Jardin Botanique, Saigon, Cochin China.

Kinsman, C. D., Nauvitas, Cuba.

E.

Royal Botanic Gardens, Kew, England.

F.

Botanical Station, Fiji.

Jardin Botanique, St. Denis, Rouen, France.

Robertson, A., Proschowsky, St. Helene, Nice, France.

G.

Station Agriculture di Missoloughi, Athens, Greece.

Agricultural Experiment Station, Agana, Guam.

Botanical Gardens, Georgetown, British Guiana.

H.

Honduras Botanical Gardens, Patuca, Honduras.

I.

Government Gardens, Allahabad, India.

Lloyd Botanical Gardens, Darjeeling, Bengal, India.

Victoria Nursery, Calcutta, India.

Royal Botanic Gardens, Calcutta, India.

Union Nursery, Darbhanga, India.

Biharilal's Garden, Horobagh Jubbulpore, India.

Barber, Dr. Chas. A., Government Botanist, Chepauk, Madras, India.

State Gardens, Morris Kathiawas, India.

State Gardens, Baroda, India.

Government House Gardens, Kirkee, Bombay, India.

Horticultural Society's Gardens, 17 Alipur Road, Calcutta, India.

The Superintendent Memorial and other Public Gardens, Cawnpur, U.P., India.
“ “ Historic and other Gardens, Delhi, Punjab, India.
“ “ Botanical Gardens, Kumaon, U.P., India.
“ “ Agricultural Horticultural Gardens, Lahore, Punjab, India.
“ “ Historic and other Gardens, Lahore, Punjab, India.
“ “ Horticultural Gardens, Lucknow, U.P., India.
“ “ Agricultural Horticultural Gardens, Madras, India.
“ “ Maharaja Bagh and other Gardens, Nagpur, Central Provinces, India.
“ Curator, Government Gardens and Parks, Ootacamund, Madras, India.
“ Superintendent, Pyzabad Park and Gardens, Pyzabad, U. P., India.
“ Botanic Gardens, Travancore, India.
“ Superintendent, The Taj and other Gardens, Ugra, U.P., India.
Mysore Botanical Gardens, Bangalore, Mysore, India.
Botanical Department, Laharanpur, N. W. Province, India.
Botanic Agricultural Gardens, Penang, India.
Botanical Gardens, Saharupur, Province of Agra and Oudh, India.
Royal Botanical Gardens, Sibpur near Calcutta, India.

J.

Botanical Department, Kingston, Jamaica.
Botanical Gardens, Kingston, Jamaica.
Sapporo Agricultural College, Sapporo, Japan.
Botanical Gardens, Imperial University, Tokio, Japan.
Yokohama Nursery Company, Yokohama, Japan.
Botanical Gardens, Buitenzorg, Java.
Government Botanical Gardens, Buitenzorg, Java.

M.

Experimental Stations, Salangor, Federated Malay States.
Department of Forests and Botanical Gardens, Pamplemoussees, Mauritius.

N.

Colonial Botanic Gardens, Napier, New Zealand.
Cokayne, L., Island Bay, Wellington, New Zealand.

P.

La State University, Batin Rouge, Peru.
Estacion Experimental, Lima, Peru.

S.

Royal Botanical Gardens, Edinburgh, Scotland.
Botanic Gardens, Penang, Straits Settlements.
Botanic Gardens, Singapore, Straits Settlements.
Director, Gardens and Forests, Botanic Gardens, Singapore, Straits Settlements.

T.

Botanical Gardens, Hobart, Tasmania.

W.

Botanical Station, Grenada Island, British West Indies.
Botanical Station, Dominica, British West Indies.
Botanical Station, Antigua Island, West Indies.
Department of Agriculture for the West Indies, Bridgeton, Barbados, West Indies.
Botanic Experiment Station, Dodds Barbados, West Indies.
Botanic Gardens, Martinique, West Indies.
Botanic Station, St. Kitts, West Indies.
" " St. Lucia, West Indies.
" " St. Vincent, West Indies.
Botanic Gardens, Port of Spain, Trinidad, West Indies.
Botanical Department, Trinidad, West Indies.

THE WILD BIRD LAW.

ACT 104

SESSION LAWS OF 1907.

AN ACT

To Provide for the Protection of Birds Beneficial to the Forests of the Territory of Hawaii and to Define the Same.

Be it Enacted by the Legislature of the Territory of Hawaii:

Section 1.—For the purpose of this Act, Hawaiian geese (nene) and all perching birds (scientifically known as Passerine) that frequent the forests of this Territory shall be considered as beneficial, except such as are specified in Section 2.

Section 2. The European or house sparrow, the house finch, the rice bird, the mynah, the native crow or alala and any imported species of perching bird (or Passerine), (injurious to forestry or agriculture) shall not be protected by this Act.

Section 3. It shall be unlawful for any person to catch or kill any perching bird (or Passerine) other than those specified in Section 2, or to have in his or her possession the body of any such bird, or to take, destroy or have in possession the nest or eggs of any such bird.

Section 4. Any person violating this Act shall be guilty of a misdemeanor and on conviction shall be fined Ten Dollars ($10.00) for each offense, and Fifty Dollars ($50.00) for each perching bird (or Passerine) killed or caught, other than those specified in Section 2, or for each body or part of the body of such bird that he or she has in possession, or for each nest or egg of such bird as is destroyed or possessed in violation of this Act; or shall be liable to imprisonment for two weeks or to both fine and imprisonment at the discretion of the court; provided, however, that the preceding sections of this Act shall not apply to any person holding a permit, issued in accordance with the provisions of the next Section of this Act, giving him or her the right to collect any species of perching bird (or Passerine), their eggs or nests for scientific purposes only, unless such person shall violate the conditions of such permit.

Section 5. To any person who shall furnish satisfactory evidence that he or she is a duly authorized agent of some scientific institution and is collecting birds, their nests or eggs, for such institution, or for private scientific study and not for sale, the Commissioners of Agriculture and Forestry of this Territory, or such agent as they appoint, may issue a permit to collect for such scientific purposes, a limited number of any species of perching birds (or Passerine), (the number of each and any species that may be caught or killed being stated by the aforesaid Commissioners of Agriculture and Forestry or the agent appointed by them), at any time between and including the first day of October and the last day of February next following, but at no other time whatsoever.

Section 6. Any person to whom such permit to collect perching birds (or Passerine), their eggs or nests shall be issued, shall file with the Commissioners of Agriculture and Forestry, or their agent, a good and sufficient bond to the Territory of Hawaii in the sum of Two Hundred Dollars ($200.00), with two responsible citizens of this Territory as sureties, conditioned that if the holder of said permit shall be convicted of violation of any of the provisions of this Act, or of those of the permit issued to him or her, the said bond shall be forfeited.

Section 7. The applicant to whom a permit to collect perching birds (or Passerine) is issued, shall pay a fee of One Dollar ($1.00) to defray the expense of such permit, said permit to bear the name and post office address of the holder, a copy of this Act, to which the holder shall attach his or her signature, and a list showing the greatest number of each species of perching bird that may be killed or caught by the holder of the permit; said permit is not transferable and holds good only for one season, i. e., from the first of October to the last day of February next following.

Section 8. In all proceedings against any person for violating the provisions of this Act, such person shall be deemed to be without the permit herein provided for unless he shall produce the same.

Section 9. All Acts and parts of Acts inconsistent with this Act are hereby repealed.

Section 10. This Act shall take effect from and after the date of its approval.

Approved this 25th day of April, A. D. 1907.

G. R. CARTER,
Governor of the Territory of Hawaii.

LIST OF THE DISTRICT FORESTERS.

(Corrected to June 30, 1908.)

Following is a list of the (thirty-nine) District Foresters with their respective jurisdictions. Those marked with a star (*) were appointed Special Territorial Police Officers to enforce the Terms of the Wild Bird Law, Act 104 of the Session Laws of 1907:

KAUAI.

*** ALBERT S. WILCOX.**

In and for the District of Halelea.

J. R. MYERS.

In and for the District of Koolau, excepting the land of Anahola. [Appointed May 20, 1908.]

*** GEORGE H. FAIRCHILD.**

In and for the land of Anahola and the northern portion of the District of Puna, extending as far as the land of Wailua.

*** F. WEBER.**

In and for the portion of the District of Puna, south of and including the land of Wailua, exeept the lands controlled by Grove Farm Plantation.

*** EDWARD BROADBENT.**

In and for those lands in the District of Puna, controlled by the Grove Farm Plantation.

REV. J. M. LYDGATE and * WALTER D. McBRYDE.

In and for that portion of the District of Kona, lying to the east of the Hanapepe Valley.

*** FRANCIS GAY.**

In and for that portion of the District of Kona, lying between and including the Waimea, Poomau and Kauaikanana Valleys on the west and the Hanapepe Valley on the east.

*** AUGUSTUS F. KNUDSEN.**

In and for the District of Na Pali and that portion of the District of Kona, formerly known as the District of Waimea, lying to the west of the Waimea, Poomau and Kauaikanana Valleys.

OAHU.

*** ANDREW ADAMS.**

In and for the District of Koolauloa.

*** L. L. McCANDLESS.**

In and for that portion of the District of Koolaupoko extending from Koolauloa to the land of Heeia.

*** W. C. WEEDON.**

In and for that portion of the District of Koolaupoko extending from and including the land of Heeia to the land of Kailua.

*** JOHN HERD.**

In and for that portion of the District of Koolaupoko extending from and including the land of Kailua to Makapuu Point.

*** PAUL R. ISENBERG.**

In and for that portion of the District of Kona extending from Makapuu Point to and including Manoa Valley.

*** WALTER F. DILLINGHAM.**

In and for the Districts of Ewa and Waianae.

W. W. GOODALE.

In and for the District of Waialua.

MOLOKAI.

*** JAMES MUNRO.**

In and for the Island of Molokai, excepting that portion between the lands of Pukoo and Halawa, inclusive.

*** C. C. CONRADT.**

In and for the portion of the east end of the Island of Molokai, lying between the lands of Pukoo and Halawa.

LANAI.

*** CHARLES GAY.**

In and for the Island of Lanai.

MAUI.

H. P. BALDWIN.

District Forester at Large for the Island of Maui.

*** L. BARKHAUSEN.**

In and for the District of Lahaina.

*** C. B. WELLS.**

In and for the District of Wailuku.

*** H. A. BALDWIN.**

In and for the District of Hamakuapoko and the western half of the District of Hamakualoa.

*** W. F. POGUE.**

In and for the District of Koolau and the eastern half of the District of Hamakualoa.

*** C. J. AUSTIN.**

In and for the District of Hana.

*** L. VON TEMPSKY.**

In and for the District of Makawao.

L. VON TEMPSKY and DR. J. H. RAYMOND.

In and for the Districts of Kula, Honuaula, and the lands beyond to and including Kaupo.

HAWAII.

*** G. C. WATT.**

In and for the District of North Kohala, and that portion of the District of Hamakua lying between the District of North Kohala and the Waimanu Valley.

*** A. W. CARTER.**

In and for the District of South Kohala.

*** A. AHRENS.**

In and for that portion of the District of Hamakua from and including the Waimanu Valley to the District of Hilo.

*** JOHN M. ROSS.**

In and for that portion of the District of Hilo extending from the District of Hamakua to the land of Makahanaloa.

*** JOHN A. SCOTT.**

In and for that portion of the District of Hilo extending from the District of Puna to and including the land of Kikala.

*** JOHN WATT.**

In and for the District of Puna.

*** JULIAN MONSARRAT.**

In and for that portion of the District of Kau extending from the District of Puna to and including the land of Punaluu.

*** GEORGE C. HEWITT.**

In and for that portion of the District of Kau extending from the land of Punaluu to the District of Kona.

*** R. VON S. DOMKOWITZ.**

In and for that portion of the District of South Kona extending from the District of Kau to the land of Kaohe.

W. R. CASTLE.

In and for that portion of the District of South Kona extending from and including the land of Kaohe to the District of North Kona.

*** JOHN D. PARIS.**

In and for that portion of the District of North Kona extending from the District of South Kona to and including the land of Kahaluu.

*** JOHN A. MAGUIRE.**

In and for that portion of the District of North Kona extending from Kahaluu to the District of South Kohala.

LIST OF DISTRICT FIRE WARDENS.

(Corrected to June 30, 1908.)

Following is a list of (forty-nine) District Fire Wardens, with their respective Districts:

CHIEF FIRE WARDEN.

RALPH S. HOSMER,

Superintendent of Forestry, *ex officio.*

DEPUTY FIRE WARDEN AT LARGE.

DAVID HAUGHS.

In and for the Territory of Hawaii.

DISTRICT FIRE WARDENS.

KAUAI.

C. W. HUDSON.

In and for the Wainiha Valley, District of Halelea.

W. F. SANBORN.

In and for the District of Halelea, excepting the Wainiha Valley.

J. R. MYERS.

In and for the District of Koolau, excepting the land of Anahola.
[Appointed May 20, 1908.]

GEORGE H. FAIRCHILD.

In and for the portion of the Districts of Koolau and Puna, extending from the land of Anahola to the land of Olohena, inclusive.

F. WEBER.

In and for the portion of the District of Puna, south of and including the land of Wailua.

REV. J. M. LYDGATE.

In and for that portion of the District of Kona, formerly known as the District of Koloa.

FRANCIS GAY.

In and for that portion of the District of Kona, lying between and including the Waimea, Poomau and Kauaikanana Valleys on the west and the Hanapepe Valley on the east.

AUGUSTUS F. KNUDSEN.

In and for the District of Na Pali and that portion of the District of Kona, formerly known as the District of Waimea, lying to the west of the Waimea, Poomau and Kauaikanana Valleys.

OAHU.

ANDREW ADAMS.

In and for the District of Koolauloa.

FRANK PAHIA.

In and for that portion of the District of Koolaupoko, extending from the Koolauloa District line to the land of Heeia.

GEORGE CAMPBELL.

In and for that portion of the District of Koolaupoko, extending from and including the land of Heeia to the land of Kailua.

JOHN HERD.

In and for that portion of the District of Koolaupoko, extending from and including the land of Kailua to Makapuu Point.

CHARLES H. BAILEY.

In and for that portion of the District of Kona, extending from Makapuu Point to Palolo Valley.

H. J. RHODES.

In and for Palolo Valley, District of Kona.

W. M. GIFFARD.

In and for that portion of the District of Kona, lying between Puaoa and Manoa Valleys.

G. H. MOORE.

In and for Pauoa and Nuuanu Valleys, District of Kona.

WALTER F. DILLINGHAM.

In and for the District of Ewa and that portion of the District of Waianae lying to the East of the Waianae Mountains.

F. MEYER.

In and for that portion of the District of Waianae lying to the West of the Waianae Mountains.

*** W. M. TEMPLETON.**

In and for the District of Waialua.

MOLOKAI.

JAMES MUNRO.

In and for the Island of Molokai, excepting that portion between the lands of Pukoo and Halawa, inclusive.

C. C. CONRADT.

In and for that portion of the east end of the Island of Molokai, between the lands of Pukoo and Halawa, inclusive.

LANAI.

CHARLES GAY.

In and for the Island of Lanai.

MAUI.

H. P. BALDWIN.

Fire Warden at Large, for the Island of Maui.

LOUIS BARKHAUSEN.

In and for the District of Lahaina.

R. C. SEARLE.

In and for the District of Kaanapali.

C. B. WELLS.

In and for the District of Wailuku.

H. A. BALDWIN.

In and for the District of Hamakuapoko and the west half of the District of Hamakualoa.

W. F. POGUE.

In and for the District of Koolau and the east half of the District of Hamakualoa.

JOHN CHALMERS.

In and for the District of Hana.

....

In and for the District of Kipahulu.

J. H. RAYMOND, M. D.

In and for the Districts of Honuaula and Kahikinui.

L. VON TEMPSKY.

In and for the Districts of Kula and Kaupo.

HAWAII.

G. C. WATT.

In and for that portion of the north half of the District of Kohala, extending from the land of Kaauhuhu to the Hamakua District line.

SAM P. WOODS.

In and for that portion of North Kohala, extending from the northern boundary of the land of Kawaihae I to and including the land of Kaauhuhu.

SAM M. SPENCER.

In and for the District of South Kohala.

AUGUST AHRENS.

In and for the western part of the District of Hamakua, extending to the boundary of the land of Paauhau.

JAMES GIBB.

In and for that portion of the District of Hamakua, extending from the western boundary of the land of Paauhau to the boundary of the land of Kukaiau.

ALBERT HORNER.

In and for that portion of the District of Hamakua, extending from and including the land of Kukaiau to the Hilo District line.

JOHN M. ROSS.

In and for that portion of the District of Hilo, extending from the Hamakua District line to the land of Makahanaloa.

JOHN T. MOIR.

In and for that portion of the District of Hilo, extending from and including the land of Makahanaloa to the land of Kikala.

JOHN A. SCOTT.

In and for that portion of the District of Hilo, extending from the Puna District line to and including the land of Kikala.

JOHN WATT.

In and for the District of Puna.

WILLIAM G. OGG.

In and for that portion of the District of Kau, extending from the Puna District line to and including the land of Punaluu.

CARL WALTERS.

In and for that portion of the District of Kau, extending from the land of Punaluu to the Kona District line.

R. VON S. DOMKOWITZ.

In and for that portion of the District of Kona, extending from the Kau District line to and including the land of Kaapuna.

T. C. WHITE. *Acting.*

In and for that portion of the District of Kona, extending from the land of Kaapuna to and including the land of Hookena.

JOHN D. PARIS.

In and for that portion of the District of Kona, extending from the land of Hookena to and including the land of Kaawaloa.

T. C. WHITE.

In and for that portion of the District of Kona, extending from the land of Kaawaloa to the land of Kahaluu.

JOHN A. MAGUIRE.

In and for that portion of the District of Kona, extending from the land of Kahaluu to the Kohala District line.

FOREST RANGER.

DAVID KAPIHE.

In and for that section of the District of Kona, Island of Oahu, bounded on the east by Manoa Valley, on the north by the Konahaunui Mountain Range, on the west by Pauoa Valley and on the south by the makai edge of the Eucalyptus forest, the Makiki reservoir and the mauka boundary of the Judd land in Makiki and Manoa.

Report of the Librarian.

Honolulu, Hawaii,
December 31, 1907.

Board of Commissioners of
Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:—

In March 1904 the Commissioners of Agriculture and Forestry requested the Superintendent of Forestry to take charge of the library and of the routine work of the Board's office. I have the honor to submit my report on these matters for the past year.

LIBRARY.

The Library of the Board consists of books, pamphlets and magazines in relation to tropical and subtropical agriculture. The special features of the Library are carefully selected collections of books dealing with Botany, Entomology, Forestry and Animal Industry; a good assortment of periodicals covering current work in the same fields; and complete sets of all the publications issued in recent years by the United States Department of Agriculture, by the several State Experiment Stations and by the Smithsonian Institution and the National Museum.

As in the past the sections of the Library dealing with Entomology and Animal Industry have remained in the direct charge, respectively, of Mr. Jacob Kotinsky and Dr. V. A. Norgaard.

The following rough classification shows the number of books, bulletins, reports and other publications in the Library, exclusive of papers and magazines. Some sixty-odd journals, issued weekly, monthly and quarterly are regularly received.

Classification of Books

in the Library of the Board of Agriculture and Forestry.

Botany	407
Forestry	250
Entomology	
Books	421
Pamphlets	1273
Animal Industry	107
Agriculture and General Science	208
Hawaiiana	171
Reference Books	64
Smithsonian Institution and United States National Museum	194
United States Department of Agriculture	1143
State Experiment Station publications	3250
Philippine publications	56
Other Government Reports	212
Miscellaneous	496
Total	8252

The Library is open to the public for reference. Visitors are always made welcome. And as far as may be, the members of the Board staff are ready to give what additional assistance may be required. Every favorable opportunity has been taken to direct the attention of the public to the Library. During 1907 the number of persons making use of it has somewhat increased—the most encouraging gain being in the way of pupils from the Normal School.

USE OF THE BOARD BUILDING.

Meetings.

The Library room of the Board building continues to be used for the meetings of the Commissioners, for forest reserve hearings, and for various gatherings having more or less closely to do with agriculture. In 1907 there were held in all twenty-six evening meetings, by the following organizations:

Hawaiian Entomological Society	6
Hawaiian Poultry Association	15
Honolulu Improvement Advisory Board	4
Waialae, Palolo and Kaimuki Improvement Club	1
Total	26

Exhibit Room.

The exhibit room with its specimens of island-grown fruits, native woods and other objects of interest continues to attract the attention of visitors. The collection of fruits is of value as showing what can be done in local gardens. These specimens demonstrate that many subtropical fruits can be grown successfully in this Territory. At present they are only found on the tables of a few individuals. Cultivated and grown with care and intelligence there is no good reason why they should not be a feature of our local markets and in time an important item in our export trade.

Visitors.

The number of visitors who registered during the year is 357. This figure is however probably not more than one half of those who called at the office of the Board on one or another errand. Persons coming to consult the members of the staff seldom sign the register and of those who are primarily sight-seers, many neglect to do so.

CLERICAL AND ROUTINE WORK.

To secure tangible results much of the work carried on by the Board of Agriculture and Forestry must have the continued backing of a strong, intelligent public sentiment. If the true aims and objects of the work are understood there is no question of securing cordial support. In order that knowledge of what the Board is doing and intends to do may be wide-spread, many reports are prepared and a large number of letters annually written. Especially is this true of the Division of Forestry, where a special effort has been made to set forth the reasons that make certain work necessary.

The Clerk of the Board is also the Stenographer of the Division of Forestry. It appears from the office records that during the year 1907, letters and reports were prepared as follows:

Reports.

Forest Committee	8
Superintendent of Forestry:	
Forest Reserves	7
Miscellaneous	7
Routine	6
Forest Nurseryman:	
Planting Plans	8
Routine	12
Total	48

Letters.

Board	20
Superintendent of Forestry	475
Chief Fire Warden	26
Librarian	36
Forest Nurseryman	372
Total	929

Distribution of Yearbooks and free seed.

In continuation of the usage of former years there were distributed through this office, during 1907, the quota of free Congressional vegetable seed and of the Yearbook of the United States Department of Agriculture for 1906 assigned to the Territorial Delegate to Congress, the Honorable J. K. Kalanianaole. Special efforts were made to place both the seed and the Yearbooks where they would do the most good. In each case the public schools, particularly those having school gardens, received first attention. But enough seed and Yearbooks were received to meet the requests of all who applied.

Personnel.

Miss Melika Peterson, the Clerk of the Board, was granted leave of absence for six months on December 21, 1907, to permit her to go to the Coast for treatment for a persistent eye trouble. During her absence her place is taken by Miss Katherine Hannestad, who had for some weeks prior to Miss Peterson's departure been engaged in clerical work at the office of the Board.

Forester and Agriculturist.

While technically distinct from the routine duties of the Board, the publication of the Hawaiian Forester and Agriculturist is so closely connected with the work of the several divisions that mention of it may properly be made here.

The Hawaiian Forester and Agriculturist is a monthly journal, issued by the Hawaiian Gazette Company of Honolulu, under the direction of the Board of Agriculture and Forestry. It is devoted to Forestry, Entomology and Agriculture—especially to the development in Hawaii of diversified agricultural industries. The editor is Mr. Leopold G. Blackman. The volume for 1907 (Volume IV), contains 372 pages and a considerable number of full page and text illustrations. The subscription price is one dollar a year.

BUILDINGS AND GROUNDS.

During the past six months a very marked and much needed improvement has taken place at the Government Nursery through the filling in of the low lying portions of the grounds and the grading and curbing of the walks. This bringing of the surface up to grade will relieve the Nursery of the excess water that in times of heavy rains formerly collected at the west end of the grounds. The filling was done through the cooperation with the Board of the former and of the present Superintendent of Public Works—Mr. C. S. Holloway and Mr. Marston Campbell. The greater part of the cost was paid from the Public Works Department appropriation for the care and maintenance of Public Buildings and grounds.

In the spring of 1907 the cottage in the Nursery grounds that for some months had remained unoccupied, was put into repair to be used by the Forest Nurseryman. Mr. Haughs moved in on April 23, 1907.

Under a special appropriation made by the Legislature in the spring of 1907, a laboratory building for the Division of Animal Industry was erected during the summer on the Ewa side of the main office building. The building was ready for occupancy in September. It will prove of great value in the work of that Division.

Besides improvements in the seed testing house, several minor changes have been made in connection with the stables and potting sheds that increase the value of the Plant by providing better and more convenient means of doing the necessary work.

When the work of improving the condition of the grounds is finally completed, the Government Nursery as a whole will be a more useful as well as a more attractive piece of Government property than at any time in its history.

Very respectfully,
RALPH S. HOSMER,
Librarian.

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TERRITORY OF HAWAII
BOARD OF AGRICULTURE AND FORESTRY

DIVISION OF FORESTRY
RALPH S. HOSMER, SUPERINTENDENT

REPORT

OF THE

DIVISION OF FORESTRY

FOR THE

YEAR ENDING DECEMBER 31, 1908

REPRINT FROM THE FIFTH REPORT OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY

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DIVISION OF FORESTRY.

Report of the Superintendent of Forestry.

Honolulu, Hawaii, December 31, 1908.

The Board of Commissioners of
Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:

I have the honor to present my fifth annual report of the work of the Division of Forestry.

Throughout the United States the year nineteen hundred and eight has been rendered memorable by the large share of attention that has been given to the consideration of the conservation of natural resources. Regarded from whatever standpoint the Conference of Governors, held at Washintgon in May, was a notable gathering. It marks the real starting point of the movement for a wiser use of the sources of wealth on which rests the material prosperity of the Nation. Following and as a direct result of that meeting the investigations of the National and of the several State Conservation Commissions have resulted in the accumulation of a body of accurate information never before available. Everywhere in the country there has been awakened an active public sentiment in favor of Conservation that will find expression in ways that cannot but prove an uplift in the life of the Nation.

To Hawaii this general movement has peculiar significance. There are few localities where, as in these islands, continued economic prosperity depends so intimately on the wise use of waters, forests and lands. The thoughtful attention that is being given the subject on the mainland should emphasize and bring home to the people of this Territory the necessity for well conceived and far reaching plans for the management of the Hawaiian forests and for the development and more complete utilization of local waters.

Hawaii is and always must be a country essentially dependent on agriculture. Because of the climatic and topographic conditions that are characteristic of these islands agriculture on a large scale cannot successfully be carried on without irrigation. Irrigation presupposes an ample and sustained water supply. This in turn points directly to the conservation of the streams through the protection of the forest-cover on the important water sheds. To meet just this need is one of the main reasons why forestry is practiced in Hawaii.

The chief object of the Hawaiian forest reserves is to assist in making water available for human use. The creation of forest reserves—so far the most important forest work undertaken in Hawaii—is therefore the direct outcome of an economic necessity. The forest reserves are not made because they contain rare or beautiful trees, or because they happen to include some wonderful scenery, but purely and simply because it is sound business policy to protect the sources of the water that is needed for irrigation, power development, the fluming of cane and domestic supply. In other words the areas that are set apart as forest reserves are of greater value because they help to conserve water than they would be if used for any other purpose. There is no mystery about the matter. It is merely good common sense so to use the rough and inaccessible areas that constitute the water sheds of the streams in most of the windward districts that they shall safeguard the supply of water needed for the development of better lying lands. Recognition of this fact emphasizes the more forcibly the necessity for forest protection and the advisability of forest work, for water is needed not only for the land now under cultivation but also for the reclamation of other areas on each island of the group that with irrigation can be made productive.

In Hawaii the two principal needs in forestry are the protection, care and wise use of the existing native forest and the planting of otherwise unproductive areas with desirable trees. Approaching the subject from this second side it will be seen that forest planting is just as directly the result of an economic need as is the creation of forest reserves. In the face of the assured fact that the wood supply on the mainland is steadily diminishing, with a consequent rise in the price of all wood products, it is only following the dictates of common prudence to make provision as far as may be for a local source of supply.

For five years now the Territorial Government has systematically followed a definite policy in regard to forestry. The work carried on falls under two broad divisions; (1) the care of the existing forest, through the creation and administration of forest reserves, and (2) forest extension, which includes the introduction into the Territory of new trees of economic importance and the planting of areas that cannot otherwise be turned to account. The object of this report is to outline briefly what has been accomplished during the past year and to show why provision should be made for the continuation of the work that has so far been done.

The features of special forest interest during 1908 are the extension of the forest reserve system, the strengthening of the sentiment in favor of forestry through the growth of a better understanding by the people of Hawaii of the aims and purposes of the forest policy of the Territorial Government, the appointment and recommendations of the Territorial Conservation Commission, the demonstration through systematic tapping experiments that rubber can be produced by the local rubber plantations at a profit, the continuation of the plant introduction work, organized on a large scale in 1907, and a very decided increase in tree planting by individuals and corporations.

The part played by the Division of Forestry in the last named work has been to furnish in large numbers trees for forest planting and to answer numerous calls for advice as to when, where and how to plant. The systematic introduction of valuable trees and shrubs into the Territory has been actively continued by the establishment in Makiki Valley of an experimental garden where promising exotic trees may be kept under observation so that later the kinds found to be desirable can be propagated for general distribution.

With the development of forest work in Hawaii needs have become apparent that must be met if the best results are to be obtained in future work. Appropriations for forestry in this Territory are in the nature of an investment. For where the development of a country is so directly dependent on the wise use of the natural resources as it is in these islands, money spent in making the forests or the waters better to serve the purposes to which man desires to put them, yields a direct return in increased crops and consequently in general prosperity.

STAFF AND APPROPRIATIONS.

The staff of the Division of Forestry consists of the Superintendent of Forestry (Ralph S. Hosmer) and the Forest Nurseryman (David Haughs). During the autumn of 1908 Joseph F. Rock has been employed as Botanical Collector, on work that will be continued during the present fiscal period. David Kapihe has remained as Forest Ranger for the Tantalus Heights District. Owing to lack of appropriation no other forest rangers have been commissioned. During the year a few changes have occurred in the personnel of the District Foresters and the District Fire Wardens. Revised lists of these volunteer officials are given elsewhere in this report.

The amounts appropriated for salaries and allotted to the Division of Forestry for current expenses under the general appropriation for the Board of Agriculture and Forestry for the present biennial fiscal period (July 1, 1907, to June 30, 1909), are as follows:

	Per Annum.	Per Period.
Salaries and pay rolls.............	$ 7,620.00	$15,240.00
Incidentals and general expenses....	4,960.00	9,920.00
	$12,580.00	$25,160.00

Adequately to carry on the work that it is within the province of the Division of Forestry to undertake requires an increase in appropriations. The particular purposes for which money is needed and the reasons why it is good policy for the Territory to increase its expenditures in this direction at this time are fully set forth in the following pages of this report.

FOREST RESERVES.

RESERVES ESTABLISHED.

The additions to the list of established forest reserves made during 1908 are the West Maui Forest Reserve, 44,440 acres—of which 19,105 acres is government land; the Makawao Forest Reserve, also on Maui, 1,796 acres, and the Waiaha Spring Forest Reserve, North Kona, Hawaii, 193 acres. The two last named reserves are entirely government land. Together these three reserves have a total area of 46,429 acres, of which 21,094 acres, or 45 per cent. is government land.

Each of the three reserves created during 1908 illustrates a principle in the forest reserve policy of the Territory. The West Maui Forest Reserve, which embraces the entire top of the West Maui Mountain above the line of agricultural land, is made essentially with the idea of protecting a water-bearing section on which depend large areas of agricultural land already under a high state of cultivation. The streams that rise in the West Maui Mountains are used for irrigation, for power development and for domestic supply. This reserve is one of the most important in the Hawaiian forest reserve system, because the streams that come from it water some of the most productive land in the Territory. The West Maui Forest Reserve includes both government and privately owned lands, but without exception the private owners are heartily in favor of the creation of the reserve. By fencing and through other action they have made the reserve effective, so that although the private areas have not technically been turned over to the Division of Forestry for management, the whole area is nevertheless fully protected.

The Makawao Forest Reserve rounds out the area of native forest on the windward slope of Mt. Haleakala from which comes the water used in irrigating the great plain of Central Maui. It represents the logical fulfillment of plans for forest protection in a given district.

The purpose of the Waiaha Spring Forest Reserve is by the setting apart of a sufficient, though comparatively small area, to protect one of the few permanent springs in the District of Kona. Being on the leeward side of the Island of Hawaii and having a soil of extreme porosity, Kona is limited for its water supply to a very few springs and water holes. Waiaha Spring is one of the water holes that can be relied on even in times of continued drought. In a section where much of the forest belongs to the "Commercial Class" it is doubly important that whatever sources of permanent water supply do exist, shall be amply protected. All three reserves created during 1908 are of the "protection forest" type, which means that the forest in them should be strictly maintained and kept permanently intact.

FOREST RESERVE STATISTICS.

There have now been set apart sixteen forest reserves in the Territory of Hawaii. The combined total area is 444,116 acres, of which 61 per cent.—273,912 acres—is owned by the Territorial Government. The following tables show various data in connection with the established reserves, arranged both chronologically and by islands and counties. Reference may here be made to the Annual Report of the Division of Forestry for the year 1906, which contains maps showing the location of the reserves on the four large islands of the group and tables giving in detail the areas of the various lands making up the several reserves at that time established.

FOREST RESERVES, TERRITORY OF HAWAII.

Arranged in Chronological Order.

(Corrected to December 31, 1908.)

No.	Name.	District.	Island.	Total Area Recommended to be Reserved. Acres.	Area Government Land. Acres.	Area Private Land. Acres.	Date of Proclamation.	Proclamation Signed by
1	Kaipapau	Koolauloa	Oahu	913	913	......	Nov. 10, 1904	G. R. Carter
2	Hamakua Pali	Hamakua	Hawaii	18,940	16,333	2,607	Dec. 23, 1904	"
	Total for the year ending December 31, 1904			19,853	17,246	2,607		
3	Hilo	Hilo	Hawaii	110,000	60,223	49,777	July 24, 1905	A. L. C. Atkinson
4	Koolau, Maui	Koolau and Hamakualoa	Maui	42,969	30,230	12,739	Aug. 24, 1905	"
5	Halelea	Halelea	Kauai	37,500	10,990	26,510	Aug. 24, 1905	"
	Total for the year ending December 31, 1905			190,469	101,443	89,026		
6	Kealia	Puna	Kauai	9,935	7,385	2,550	Mar. 9, 1906	"
7	Ewa	Ewa, Waianae and Waialua	Oahu	28,550	5,151	23,399	Mar. 9, 1906	"
8	Honuaula	Kona	Hawaii	665	665	......	April 4, 1906	"
9	Kau	Kau	Hawaii	65,850	59,618	6,232	Aug. 2, 1906	G. R. Carter
10	Waianaekai	Waianae	Oahu	3,257	3,150	107	Sept. 7, 1906	"
11	Lualualei	Waianae	Oahu	3,743	3,743	......	Nov. 30, 1906	"
12	Hana	Hana	Maui	14,825	13,767	1,058	Nov. 30, 1906	"
	Total for the year ending December 31, 1906			126,825	93,479	33,346		
13.	Na Pali-Kona	Na Pali and Kona	Kauai	60,540	40,650	19,890	June 12, 1907	A. L. C. Atkinson
	Total for the year 1907			60,540	40,650	19,890		
14	West Maui	Lahaina, Kaanapali and Wailuku	Maui	44,440	19,105	25,335	April 21, 1908	W. F. Frear
15	Makawao	Hamakuapoko	Maui	1,796	1,796	......	April 21, 1908	"
16	Waiaha Spring	Kona	Hawaii	193	193	......	April 21, 1908	"
	Total for the year ending December 31, 1908			46,429	21,094	25,335		
	Grand Total December 31, 1908			**444,116**	**278,912**	**170,204**		

FOREST RESERVES, TERRITORY OF HAWAII.

Arranged by Islands and Counties.

(Corrected to December 31, 1908.)

No.	Name.	District.	Island.	Total Area Recommended to be Reserved.	Area Government Land.	Area Private Land.	Date of Proclamation.	Proclamation Signed by
			COUNTY OF KAUAI.					
				Acres.	Acres.	Acres.		
5	Halelea	Halelea	Kauai	37,500	10,990	26,510	Aug. 24, 1905	A. L. C. Atkinson
6	Kealia	Puna	Kauai	9,935	7,385	2,550	Mar. 9, 1906	"
13.	Na Pali-Kona	Na Pali and Kona	Kauai	60,540	40,650	19,890	June 12, 1907	"
	Total			107,975	59,025	48,950		
			COUNTY OF OAHU.					
1	Kaipapau	Koolauloa	Oahu	913	913	......	Nov. 10, 1904	G. R. Carter
7	Ewa	Ewa, Waianae and Waialua	Oahu	28,550	5,151	23,399	Mar. 9, 1906	A. L. C. Atkinson
10	Waianaekai	Waianae	Oahu	3,257	3,150	107	Sept. 7, 1906	G. R. Carter
11	Lualualei	Waianae	Oahu	3,743	3,743	......	Nov. 30, 1906	"
	Total			36,463	12,957	23,506		
			COUNTY OF MAUI.					
4	Koolau, Maui	Koolau and Hamakualoa	Maui	42,969	30,230	12,739	Aug. 24, 1905	A. L. C. Atkinson
12	Hana	Hana	Maui	14,825	13,767	1,058	Nov. 30, 1906	G. R. Carter
14	West Maui	Lahaina, Kaanapali and Wailuku	Maui	44,440	19,105	25,335	April 21, 1908	W. F. Frear
15	Makawao	Hamakuapoko	Maui	1,796	1,796	......	April 21, 1908	"
	Total			104,030	64,898	39,132		
			COUNTY OF HAWAII.					
2	Hamakua Pali	Hamakua	Hawaii	18,940	16,333	2,607	Dec. 23, 1904	G. R. Carter
3	Hilo	Hilo	Hawaii	110,000	60,223	49,777	July 24, 1905	A. L. C. Atkinson
8	Honuaula	Kona	Hawaii	665	665	......	April 4, 1906	"
9	Kau	Kau	Hawaii	65,850	59,618	6,232	Aug. 2, 1906	G. R. Carter
16	Waiaha Spring	Kona	Hawaii	193	193	......	April 21, 1908	W. F. Frear
	Total			195,648	137,032	58,616		
	Grand Total			444,116	273,912	170,204		

RESERVES PROJECTED.

It usually happens at the end of any given period that besides the forest reserves actually set apart there are other forest reserve projects pending final action. In the present instance three projects are practically at the point of completion, the Kohala Mountain Forest Reserve on Hawaii, 27,160 acres, and the Lihue-Koloa and the Moloaa Forest Reserves, both on Kauai, respectively, 29,260 and 5,670 acres. These reserves are now before the Board for final consideration. It is expected that they will be set apart early in the coming year. Other forest reserve projects await the completion of the technical descriptions of boundary or require additional field work before being reported on to the Board.

At the request of this office a comprehensive survey has been made by the Territorial Government Survey of the government forest lands in South Kona, Hawaii. This survey will serve as a basis for a systematic classification of those lands, as well as for the setting apart of portions of them as a forest reserve. It is decidedly a part of the policy of the Board of Agriculture and Forestry to stand for the better classification of all lands owned by the government. Indeed, this is felt by all those who have seriously studied the local land problem to be one of the most obvious ways of relieving the present unsatisfactory situation. The survey of the South Kona lands is a step in the right direction.

FOREST AREAS.

Apropos of the creation of additional forest reserves, an estimate of the area now under forest in the Territory of Hawaii, made recently from the best data available, may be of interest. The forest areas are classified according to the three main Hawaiian forest types, the Koa and Ohia forest, the Mamani forest on the higher slopes of Mauna Kea on Hawaii, and the Algaroba forest at the lower elevation on the leeward side of each island. The areas are as follows:

Island.	Koa and Ohia. Acres.	Mamani. Acres.	Algaroba. Acres. (Approximate)	Total Acres.
Kauai	148,115	.....	8,000	156,115
Oahu	111,271	.....	23,400	134,671
Molokai	39,000	.....	10,000	49,000
Lanai	2,300	.....	.....	2,300
Maui	115,896	.....	12,000	127,896
Hawaii	758,418	63,500	7,000	828,918
Total	1,175,000	63,500	60,400	1,298,900

The areas given include both government and privately owned land. All of the forest reserves so far set apart are in the Koa and Ohia forest type. Out of the area covered by this type of forest—approximately 1,175,000 acres—there have already been set apart 444,116 acres, of which 61 per cent. is government land. When the chain of projected forest reserves is complete it is estimated that about 750,000 acres will have been set apart as forest reserves, of which about 70 per cent. will belong to the government. For a further description of the forest types present in Hawaii reference may be made to the Report of the Territorial Conservation Commission (in Appendix A, Report of the Committee on Forests) which appears as an appendix to this annual report, in another part of the present publication.

UNDERLYING PRINCIPLES OF THE HAWAIIAN FOREST POLICY.

In a subject so intimately connected with the continued welfare of the Territory as is forestry, it is well that there should be a clear understanding of the principles on which the forest policy of the Territorial Government is based. An annual report gives the opportunity for a restatement of the "reasons why." Perhaps it may not be out of place once again to outline the essential facts.

There are in Hawaii two main classes of forest land, which for the sake of convenience have been termed the "water-bearing forest" and the "commercial forest." The water-bearing forest is situated for the most part in the windward districts and covers the water sheds and catchment basins of the streams that are needed for irrigation, power development and other economic uses. The chief value of this forest is that it protects the headwaters of these streams. Its most important product is water, and the treatment indicated for it is therefore the one which will best serve to produce the largest quantity of water.

This class of native Hawaiian forest belongs to what is known as the "rain-forest" type, common in the tropics. To render to the full its beneficial service as a conservator of water, it is essential that the forest cover be kept strictly intact, for owing to its character and composition the Hawaiian forest is easily damaged by the inroads of cattle and other enemies. The method of management best adapted to secure the result desired with this class of forest is to keep it as a "protection forest," from which men and animals are strictly excluded. Only by so managing it can it be made to yield permanently the largest share of its most valuable product, water. All but one of the sixteen forest reserves so far set apart are in the water-bearing forest class. They are therefore to be considered and treated as protection forests.

The other main class of Hawaiian forest, the commercial forest, is found for the most part in the districts on the leeward side of the Island of Hawaii, where from the nature of the topography and the remarkable porosity of rock and soil there are no permanently running streams and only occasional springs. In such districts it is obvious that the protection of water sheds does not figure. Consequently the chief value of the commercial forest lies in the wood and timber which it can be made to produce. Fortunately over a considerable portion of the commercial forest reproduction can be secured through natural means, so that successive crops of valuable timber can be obtained, provided the forests are managed in accordance with the dictates of practical forestry.

Important as the commercial forest is, it should be clearly borne in mind that in Hawaii the water-bearing forest is far and away the more important of the two classes, and that wherever it—the water-bearing forest—occurs it should, because of its relation to the economic development of the Territory, not only be carefully protected but so managed that it may be of the greatest use possible.

THE APPLICATION OF THE PRINCIPLES.

The practical application of the principles above set forth is—and the point should be urged strongly—that until provision is made for adequately protecting the forest reserves from injury by fire, animals and trespass, the Hawaiian forests cannot be made to serve to the full the objects for which the reserves are created. The essential needs are money for fencing such stretches of the reserve boundaries on government land as cannot be provided for through fencing provisions in the leases of adjoining government lands; a fund for fighting forest fire on government land; and an appropriation sufficient to permit the employment of forest rangers to protect the reserves from fire, to see that the boundaries are maintained and respected, to prevent trespass of animals and men, and in general to give to the forest the care that it requires to be made of the greatest service.

What has so far been done is practically to provide a skeleton of forest reserve administration. The defining of boundaries, the reports and recommendations, the official proclamation of the area as a reserve are all necessary steps essential to the creation of a legal forest reserve. As such they justify the time that has to be spent on them. But no one understands more clearly than do the members of the Division of Forestry that it takes more than reports and the coloring in of areas on a map to make an efficient forest reserve. To make the forest reserve system of

Hawaii truly effective requires men as well as maps. The intimate relation between forest protection and the continued economic welfare of the Territory is apparent. It is because I believe the need is vital that I urge so strongly that provision be made for an adequate force for forest reserve administration.

The problem of what should be done is simple. The most important product of the Hawaiian forest reserves is water. To get the largest quantities of water for the longest time and with as little fluctuation as possible requires in the case of most Hawaiian streams that the forest cover on the catchment basin be kept strictly intact, and that where it has once been opened up by cattle or through other causes, the forest cover shall be replaced and thereafter protected and maintained.

Forest Rangers.

Specifically three things are particularly needed; forest rangers, fences for certain portions of forest reserve boundaries, and a fund for fighting forest fires on government land.

The chief duties of forest rangers would be to protect the forest reserves from trespass by stock and from damage by forest fire. To accomplish this it is necessary that the reserves be properly enclosed and that the fences be maintained and kept in repair. To facilitate patrol duty and to enable the rapid transfer of men in case of fire, trails should be built and kept in repair. Added to these duties the rangers in certain reserves would have to capture or destroy wild cattle, goats and other animals at large in the forest; in others they would be required to oversee forest planting.

Incidental to more important uses, trails in certain of the forest reserves would enable the use of the forests by the people as parks. Especially is this true in localities noted for the beauty or picturesqueness of the scenery, or otherwise of interest to visitors. Examples are the Iao Valley in the West Main Forest Reserve on Maui, and Konahuanui Peak in the projected forest reserve above Tantalus, back of Honolulu. Such use of the forest would in no way interfere with the objects of the reserve, but on the contrary by familiarizing more people with the forests, would tend to bring home to a larger number the intimate relation that forest protection bears to the life of the Territory.

For an at all adequate administrative organization, twelve forest rangers are imperative. This number is meagre in view of the area to be covered and the nature of the work to be done, but twelve efficient men could do much. Figuring on established and prospective forest reserves, with this force the districts would be as follows:

Hawaii	Puna and Hilo Districts	1
	Kohala and Hamakua Districts	1
	Kau District	1
	Kona District	1
Maui	West Maui	1
	Koolau and Hana Districts	1
Molokai		1
Oahu	Waianae Mountains	1
	Koolau Range	1
	Tantalus and Vicinity	1
Kauai	Na Pali, Kona and South Puna Districts	1
	Halelea, Koolau and North Puna Districts	1
	Total	12

The absence of forest rangers reacts unfavorably on the forests of Hawaii in two ways. First, it is now impossible to take effective measures toward suppressing trespass by stock and preventing damage by forest fire. Second, until the Board of Agriculture and Forestry can offer at least an equally good administration of the forest reserves, private corporations and individuals will be slow in turning over their forest lands to the Board for management. To secure the best results from forests of the type common to the Hawaiian forest reserves requires that all the lands in any given reserve be under the control of one central authority. It would be well if the title to all the lands in all the established forest reserves could be transferred to the Territorial Government. But as the Territory is not likely for a considerable time to be in a financial position that would make such a consummation possible, there is the more need to bring about a condition of things that shall lead to a transfer of the management of the privately owned tracts to the Territorial forest officials.

Forest Reserve Fencing.

Wherever possible the boundaries of the forest reserves are made to follow natural barriers. But there are numerous places where fencing is required. In many instances a short stretch of fence will protect considerable areas of forest. Money is needed to fence such portions of forest reserve boundaries across government lands. Often it is not possible to make the building of the fence a condition of the lease of adjoining government land, so that in the absence of a special fund it is impossible to get the work done at all. This results in damage from stock and in other injury to the forest.

Forest Fire Fund.

It ought not to require argument to show the necessity for money with which to fight forest fires on government land. Under the present law owners or lessees of private or of government lands can be held responsible for fires that spread to other lands and so can be made to take active steps to combat fires. But there is no way in which payment can now be made for fighting fire on unleased land owned by the government. As much of the land in the forest reserves is in this case, the need is one of pressing importance. The coming session of the Legislature ought not to end without provision for a special fund to be used in emergencies.

H. S. P. A. RESOLUTION.

In this connection it may not be out of place to quote a resolution unanimously adopted at the annual meeting of the Hawaiian Sugar Planters' Association, held in November, 1908, in that it voices the sentiment of the strongest commercial organization in the Territory.

"Resolved, That in the opinion of the Hawaiian Sugar Planters' Association the work of forest protection and extension is of the highest importance to the agricultural interests of this Territory;

"That in the opinion of this Association the time has arrived when liberal appropriations should be made for such protection and extension, and we hereby petition the Legislature to make liberal specific appropriations for forest fencing; for rangers to inspect and protect the forests from fire, depredation and trespass; and for replanting with trees areas which have been heretofore denuded of forest."

DAMAGE BY GOATS.

Under the subject of Forest Reserves attention should again be called to the serious damage resulting to the forests from the depredations of wild goats. In my report for 1907 I recommended that Act 116 of the Session Laws of 1907, requiring the payment of a hunting license fee, should be so modified as to permit the free shooting of wild goats in established forest reserves. By a proper system of permits, issued by the District Forester or other local official, it could easily be arranged so that the privilege could not be abused. This amendment to the law is one that I believe should unquestionably be made.

FOREST EXTENSION.

The second main branch of work carried on by the Division of Forestry is Forest Extension. Its aim is to encourage tree planting. This it seeks to do by the systematic introduction of desirable trees and shrubs new to the Territory, by giving advice to persons desiring it on what, where and how to plant, and by furnishing seed and seedling trees at cost price from the Government Nursery.

The Section of Forest Extension is under the direct charge of Mr. David Haughs, Forest Nurseryman. For a statement of what has been accomplished during the past year, Mr. Haughs' report should be consulted. It sets forth briefly the essential facts and makes evident that this phase of the work of the Division of Forestry is constantly broadening in scope and developing in importance.

EXPERIMENTAL GARDENS.

It is unnecessary to repeat the points brought out in Mr. Haughs' report, but special mention should be made here of the establishment of an Experimental Garden in Makiki Valley, where will be set out and kept under observation the plants resulting from seed received in exchange from foreign sources and started in the specially constructed germination houses at the Government Nursery. As the result of the establishment of the systematic exchange of seed, inaugurated on a large scale in 1907 with over one hundred botanic gardens and other similar institutions throughout the world, many kinds of seed have been received. There can be no question that when these new plants come to be properly tested there will be found among them not a few desirable additions to our introduced flora. It follows, of course, that the plants found to be desirable will be propagated and eventually distributed.

In connection with the work of plant introduction mention should also be made of the establishment of an experimental subgarden at Kalaheo, on Kauai. To protect a reservoir site in the upper portion of the Kalaheo Homestead Tract a couple of lots had been reserved from entry and turned over to the Department of Public Works. This area, "Papapaholoholo," was in turn transferred to this Department in order that it might be used for tree planting. At the request of this office Mr. Walter D. McBryde, the local District Forester, an enthusiastic tree planter who has done a very considerable amount of tree planting on adjoining private lands, consented to oversee the planting and direct the work locally. Accordingly the area has been fenced and one laborer employed to work under Mr. McBryde's supervision. In the garden so made it is the intention to plant out such of the newly introduced trees and shrubs as appear suitable for use at the elevation and situation of Kalaheo.

New trees and shrubs are now sent out for experimental planting to a number of persons in various parts of the Territory who are interested in tree planting, but for the most part, naturally enough, there is a disinclination to take much trouble with new plants until it is known definitely whether or not they will do well and be of use in this Territory. In order to test more thoroughly the newly introduced plants and in view of the difficulties of local transportation, I believe it would be well to have a number of sub-gardens in different parts of the Territory, where trees new to the islands could be tried under varying conditions of elevation, soil and exposure and from which seedlings of the trees in common demand could be distributed for forest and other planting. Data obtained from careful observations made from time to time at such sub-stations as Kalaheo would supplement those obtained at the Makiki Garden and in the end would prove of decided benefit to the people of the Territory.

The main objection to the establishment of such sub-stations is the cost. Unless the work can be carried on under the supervision of a capable and suitably trained person satisfactory results cannot be expected. The matter is mentioned at this time in that it is a desirable line of work for the Division of Forestry to engage in should at any time means to carry it on be made available.

PLANT INTRODUCTIONS OF SPECIAL IMPORTANCE.

In connection with this subject special attention should be called to that section of the Forest Nurseryman's report that tells of the successful introduction into Hawaii, through the coöperation and assistance of this Division, of two plants of high economic importance, Mocha Coffee and Esparta, a grass valuable for weaving and other work. Without the special facilities possessed by the Division of Forestry for the handling of difficultly propagated plants it would have been impossible to give the seed of these plants the necessary treatment.

EXPERIMENTAL TREE PLANTING ON THE HIGH MOUNTAINS.

In 1907 there was secured from the United States Forest Service an allotment of $2,000.00 for experimental tree planting on the upper slopes of Mauna Kea and Haleakala, above the upper limit of the native Hawaiian forest. This allotment was subsequently cancelled by direction of the Comptroller of the United

States Treasury. But in 1908 an equal amount was again alloted. At the end of the calendar year arrangements are complete for carrying the plans into effect. The field work will start early in 1909.

Briefly, the object of this experiment is to try at elevations of from six to ten thousand feet valuable timber trees from the temperate zone, primarily conifers, with the expectation that some among those tested will be found to be adapted for local use. It is hoped that eventually, as a result of this experimental planting, a forest can be established on the now unproductive upper slopes of these two mountains.

The segregation of waste land and its retention by the government when old leases of government land run out and new leases come to be made has consistently been a part of the policy advocated by the Board of Agriculture and Forestry. The present instance shows the advisability of this policy. For if, as is reasonably to be expected, valuable trees can be made to grow on this otherwise waste upland, it is certainly advisable that the area be in the control of the Territory. Under the old method of leasing large government lands as a whole, the waste areas were thrown in with the better land, swelling the acreage but adding no real value to the leasehold. As it is now each part of the land can, as it is needed, be put to the use for which it is best adapted.

PROGRESS IN FOREST PLANTING.

That forest planting is increasing in Hawaii is shown by the following tabulated record made up from answers to a schedule of inquiries that was sent out to each of fifty-two sugar plantations and to thirty-six stock ranches. The table shows that twenty-eight sugar plantation companies are now engaged more or less extensively in tree planting, usually on waste land; of this number all but one began planting earlier than 1908; almost all expect to continue the work in 1909. Of the sixteen ranches that responded nine are in the list of tree planters. All but one began the work earlier than 1908. All expect to continue during 1909.

As many of the companies doing tree planting work have not kept complete records, such a table as this is, of course, only an approximation, but it may safely be said that in every case it errs on the side of being conservative. The area and number of trees actually planted are therefore greater than the figures here given, especially for the work done prior to 1908.

In all during the past year, 325,824 trees have been planted by the plantation companies reporting; by the ranches 172,853; making a grand total of 498,677.

Tree Planting in Hawaii Now Being Done by Sugar Plantation Companies and Stock Ranches.

Kauai.

Name of Corporation	Total Area Planted	Area Planted in 1908	Total No. Trees Planted	Trees Planted in 1908	Began Planting	Intend to Plant in 1909
	Acres.	Acres.				
Grove Farm, G. N. Wilcox, Prop.	100	5	40,000	3,000	1906	Yes
Lihue Plantation Co.	1,100	50	......	20,000	1882	Yes
Makee Sugar Co.	...	..	*7,500	*4,000	1907	Yes
McBryde Sugar Co.	...	..	62,648	16,925	1900	Yes
	1,200	55	110,148	43,925		
McBryde Homesteads (under direction of Mr. Walter D. McBryde)	25	6	65,000	15,000	1904	Yes
Total	1,225	61	175,148	58,925		

Oahu.

Name of Corporation	Total Area Planted	Area Planted in 1908	Total No. Trees Planted	Trees Planted in 1908	Began Planting	Intend to Plant in 1909
	Acres.	Acres.				
Ewa Plantation Co.	...	..	......	10,972	1907	Yes
Honolulu Plantation Co.	10	..	2,000	......	1899	Yes
Laie Plantation	...	..	5,000	2,000	1899	Yes
Kahuku Plantation Co.	...	..	*30,000	*10,000	1903	Yes
Waianae Company	26	4	11,562	1,794	1906	Yes
	36	4	48,562	24,766		
Kaneohe Ranch Co.	10	..	10,500	10,500	1908	Yes
Oahu Railway & Land Company Ranch Department	..	..	25,000	3,000	1898	Yes
Maunawili Ranch	300	57	25,120	4,536	1896	Yes
	310	57	60,620	18,036		
Total	346	61	109,182	42,802		

Maui.

Name of Corporation	Total Area Planted	Area Planted in 1908	Total No. Trees Planted	Trees Planted in 1908	Began Planting	Intend to Plant in 1909
	Acres.	Acres.				
Kaeleku Sugar Company	3	...	1,500	300	1906	Yes
Maui Agricultural Co.	*700	88	*400,000	151,000	1900	Yes
Olowalu Company	...	...	200	75	....	Yes
Wailuku Sugar Co.	*30	*30	4,478	4,478	1908	Yes
Hawaiian Commercial & Sugar Company	...	...	34,629	......	1902	Yes
	733	118	440,807	155,853		
Cornwell Ranch	...	...	1,000	......	1906	Yes
Haleakala Ranch	180.25	19.25	106,830	19,665	1900	Yes
Maui Agricultural Company's Ranch	*100	30	*80,000	22,000	1906	Yes
	280.25	49.25	186,830	41,665		
Total	1,013.25	167.25	627,637	197,518		

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* Approximate figure.

Hawaii.

Name of Corporation	Total Area Planted	Area Planted in 1908	Total No. Trees Planted	Trees Planted in 1908	Began Planting	Intend to Plant in 1909
	Acres.	Acres.				
Hakalau Plantation Co..........	...	...	*3,000	500	1906	Yes
Halawa Plantation Co...........	3	1	......	2,000	1890	Yes
Hawaiian Agricultural Co......	25	5	16,000	3,000	1905	Yes
Hawi Mill & Plantation Co......	8	...	......	2,000	....	No
Hilo Sugar Company............	...	...	2,570	120	....	Yes
Hutchinson Sugar Plantation Co.	...	4.5	......	1,360	....	Yes
Kohala Sugar Co...............	*250	*23	*200,000	*18,000	1896	Yes
Kukaiau Mill Co................	...	...	*4,000	2,500	1907	Yes
Laupahoehoe Sugar Co..........	4	...	200	......	(Ornament only)	
Niulii Plantation	...	...	6,000	1,000	....	Yes
Olaa Sugar Co.................	...	...	1,000	1,000	....	No
Pacific Sugar Mill.............		Extensive planting in past years.				
Paauhau Sugar Plantation Co...	115	30	115,275	52,200	1891	Yes
Pepeekeo Sugar Co.............	6	...	......	2,000	1905	Yes
Puakea Plantation Co..........	...	...	2,000	600	1900	Yes
	411	63.5	350,045	86,280		
Kukaiau Plantation Company's Ranch	517	194	278,952	112,952	1894	Yes
Parker Ranch	...	...	*15,000	......	1903	Yes
Puuwaawaa Ranch	...	...	1,000	200	....	Yes
	517	194	294,952	113,152		
Total	928	257.5	644,997	199,432		

Summary.

	Plantations.		Ranches.		Totals.	
Island.	Total Trees Planted.	Trees Planted 1908.	Total Trees Planted.	Trees Planted 1908.	Total Trees Planted.	Trees Planted 1908.
Kauai	175,148	58,925	......	......	175,148	58,925
Oahu	48,562	24,766	60,620	18,036	109,182	42,802
Maui	440,807	155,853	186,830	41,665	627,637	197,518
Hawaii	350,045	86,280	294,952	113,152	644,997	199,432
Total	1,014,562	325,824	542,402	172,853	1,556,964	498,677

A LOOK AHEAD.

The planting of practically half a million trees during one year is a record decidedly worth while. It shows that the men in the Territory who have most occasion to use wood are awake to the fact that the sources of supply are diminishing and that they are preparing to meet the need by providing a local supply. But encouraging as is the start made, it is only a small part of what ought to be done.

The investigations of the Section of Forests of the National Conservation Commission—the results of which have but lately been made public—show that the amount of wood annually used on the American mainland is 3½ times the amount yearly produced by the forests. The uses of wood are constantly increasing and the prices of all wood products are steadily going up. Wasteful methods, coupled with ever-enlarging demands, have now brought things to a point where a timber famine is inevitable. How severe and of how long duration this wood famine will be depends very largely on how soon the annual production of wood is made to balance the annual consumption. The remedy lies in the better management of the forests, in lessening the waste that occurs all the way from the stump to the consumer, in prolonging the life of wood through preservative treatments, in stopping loss from forest fires, and most of all, in forest planting. As a result of the lessening supply of wood some of the above suggested remedies are coming to be applied, but it is too late to avert the impending crisis. The only real solution, the only way to get at the root of the difficulty, is to make production equal out-go.

Hawaii is in no wise exempt from the perplexities that will follow the coming scarcity of timber. Indeed this discussion is particularly pertinent here in that so large a portion of the wood products used locally, and practically all of the construction timber used in the islands, is imported.

The reports of the United States Department of Commerce and Labor give the imports of timber, boards and plants into Hawaii for the fiscal year ending June 30, 1907, as 30,603,000 feet, board measure; with a value of $565,425.00. For the fiscal year ending June 30, 1908, the corresponding figures are 29,191,000 feet, board measure, and $477,422.00. These figures need no further comment. But it may be said that those persons who start forest plantations now will be the best prepared to meet the additional pressure when it comes, as it surely will, within a few years.

The needs for railroad ties, fence posts, fuel and construction timber can all be met, at least in part, by trees that can be grown in the islands. The Division of Forestry stands ready to advise what kinds should be planted to obtain certain results, and to show when, where and how to go about the work. Much good work has been done in 1908. It is for the far-sighted to make 1909 a year phenomenal for its tree planting.

RECOMMENDATION.

The greatest drawback at present to a more rapid extension of tree planting in Hawaii is that many persons who otherwise would plant trees hesitate because they can not find out just what returns may reasonably be expected under local conditions. This is information that should be available and which it is the business of the Division of Forestry to obtain. The necessary data can be got from the systematic measurement of planted groves of varying ages. There is enough planted forest in Hawaii to give all the figures required, but it needs technically trained men to do the work. A start in this direction was made by the Division of

Forestry two years ago, but the pressure of other work, with a staff of only two men, has prevented its being continued.

What the Division of Forestry needs is another assistant—a man technically trained in the profession of forestry, who has also had practical experience. The calls that are made on the Division in this and in allied branches of forest work more than justify the necessary outlay in salary, for the benefit that would result from the increased efficiency of the Division of Forestry would be a good return on the investment.

I accordingly recommend that in the estimates for the next fiscal period provision be made for the appointment of a technically trained assistant in the Division of Forestry.

TREE PLANTING UNDER A GOVERNMENT LEASE.

Pertinent for consideration under Forest Extension is a new departure in forest policy made during 1908, in the requirement in a lease of government land for grazing purposes, that a definite number of trees be planted on specified portions of the tract. The lands in question are situated in the District of Hamakua, Island of Hawaii, and the leases (Nos. 623, 625 and 626) are made to the Kukaiau Plantation Company, of which Mr. Albert Horner is Manager. The lands required to be planted were formerly under forest, but owing to a variety of causes, chief among which were the forest fires of 1901, the original forest has now completely disappeared and been followed by a dense cover of rank growing grass that effectually prevents forest reproduction.

After a thorough study of the whole situation on the ground the Superintendent of Forestry reported adversely on the proposal to have this area set apart as a forest reserve, in that, under the conditions that had come to exist, and in view of the fact that there were no permanently running streams to be protected, the land could more advantageously be used for other purposes than forest. The object of the present planting then is not the reforestation of the area, but its improvement through the planting of groves of trees that shall serve, when safely established, as stock shelters in connection with the ranch and ultimately as a local supply of wood and timber.

Incidentally, if then so desired, the groves now established could be used a score or more years hence as seed spots for the extension of a forest cover through natural reproduction. What is more likely is that by that time the land can be used for some more intensive form of agriculture than grazing, through the gradual development of the district, made possible through improved facilities of transportation.

The tree planting clauses of the leases provide that Eucalyptus trees shall be planted at the rate of 40 to the acre—the actual planting, however, to be in groves, with the trees 8 feet apart—and that that number in good condition shall be maintained during the term of the (twenty-one year) lease. The proposal that a tree planting clause be inserted in the leases originated with Mr. Horner, who following in the footsteps of his father, the late John M. Horner, has for a number of years been actively engaged in tree planting on the ranch. The trees to be used are Eucalypts, at first mainly Blue Gum. But it is provided that other species may be substituted on approval by the Superintendent of Forestry.

The precedent established in this instance will unquestionably lead to the insertion of similar clauses in other leases of grazing land elsewhere in the Territory, for there are many localities where tree planting which could not otherwise be undertaken can thus be provided for. In some cases this method of planting can be used as a step to the reforestation of a denuded area. In any event the value of the land to the government would be increased through the presence of groves of thirfty trees.

MISCELLANEOUS FOREST WORK.

In addition to its two main lines of forest work—forest reserve administration and forest extension—the Division of Forestry is charged with the duty of promoting the forest interests of the Territory in other ways. With the development of the lumber industry in Hawaii, brought into especial prominence during the past two years through the operations of the Hawaiian Mahogany Lumber Company in Puna, Hawaii, attention has been called to the commercial side of forestry and to the possibility, in certain districts of the Territory, of deriving a revenue from the government forests.

It has already been made clear in this report that there are two classes of forest in Hawaii—the water bearing forest and the commercial forest—and that radically different treatment is required to make each one serve its purpose to the best advantage. The policy of the Territorial government in protecting the more important class—the water bearing forest—through the creation of forest reserves, managed as "protection forests," has also been fully discussed.

It is equally the policy of the administration, in districts where the Territorial forests are of the commercial class, to make the forest revenue producing by exploiting it in accordance with the methods of practical forestry. But in forestry there is no hard and fast rule that can everywhere be followed. On the contrary each case must be decided on its own merits. Especially is this true in Hawaii where lumbering is a new departure and where the absence of local experience makes the problem of the best subsequent treatment of the tract to be cut over, a matter that should have the most careful attention.

FOREST MANAGEMENT.

The conditions obtaining in the District of Puna, on the Island of Hawaii, are such on general principles as to justify lumbering. There are and can be no running streams. Consequently the question of watershed protection is not a factor. The forest is essentially of the "commercial class."

But this in itself does not predicate that the present is necessarily the best time at which to lumber the Puna forests. The condition of the forest, the stumpage prices to be got now and that may be expected in the future, the methods by which the work in the woods would be done, and the use to which the land would be put after lumbering, are all factors that, with others, enter into the problem. To be prepared intelligently to deal with the Puna problem, especially in view of an application from the Hawaiian Mahogany Lumber Co. for stumpage rights on the government forest lands in Puna, the Superintendent of Forestry made two visits to the district in 1908, respectively in September and December. His report thereon is now in course of preparation. It will be made public early in 1909 and will contain a statement of facts, with specific recommendations.

The Hawaiian Mahogany Lumber Company.

As a matter of record it may be noted here that the plans of the Hawaiian Mahogany Lumber Company have been somewhat slow in developing, due to various unforseen obstacles that have arisen from one cause or another. Lumbering is a new industry in Hawaii and it is not surprising that there should be some difficulty in getting it under way.

A large modern saw mill has been erected by the Company at Pahoa, Puna, Hawaii, and operations were begun there in September. On December 1, 1908, the first regular shipment of ties for the Santa Fé Railway was dispatched from Hilo in the schooner Emily F. Whitney. The lot consisted of 20,058 standard Ohia Lehua ties. It will be recalled that the contract with the Santa Fé Railway made in September, 1907, calls for 500,000 ties annually for five years.

Fifteen thousand feet of Ohia lumber was sent to California in November in an attempt to find a market for the by-product resulting from the waste that comes in squaring rough logs for tie purposes. The Lumber Company plans to work up some of this material as telephone insulator pins and brackets, for which purpose Ohia is excellently well adapted.

In order to concentrate all its energies on logging Ohia for ties, the Company has temporarily discontinued its operations in the Koa forests.

Utilization of the Commercial Forest.

The inauguration of the lumber industry in Hawaii points to the need for a careful investigation of all the forests owned by the Territory in the leeward districts on the Island of Hawaii that belong to the commercial forest class. In several cases already, applications have been made for logging rights. Others are sure to follow. The Territorial officials should be in touch with the exact conditions so as to be able to act without delay. In this same connection the Division of Forestry is in frequent receipt of requests from owners of private forest belonging to the commercial class, for advice on how best to manage their forest properties.

Because forests react on the life of a community in so many and in so diverse ways, the wise management of the forests of any given state is a matter of concern not alone to those persons who own the forests but to all the people. A large proportion of the forest area in this Territory is now and will remain in private ownership. But it is well within the province of the government to take such steps as it reasonably may to induce private owners to manage their forest properties wisely.

To meet requests for advice on these matters is consequently a distinct part of the forest policy of the Territory and should form a regular section of the work of the Division of Forestry. It is as much a part of forestry to cut, as to plant trees. In either case there is a right way and a wrong way to go about the work. The purpose of the Division of Forestry in its offer of advice and assistance is to help private owners to manage their forests, be they natural or artificially planted, in the way that will make them of the greatest service.

Supervision of Lumbering.

Should it later be found advisable to grant logging rights in certain of the government forests, it follows that the work would be done in accordance with careful regulations prepared by this department, executed under strict supervision.

Both the investigations and the subsequent administrative inspection of forests of the commercial class are work that require the services of men technically trained in forestry. Mention has already been made, in connection with Forest Extension, of the need of another assistant in the Division of Forestry. The increase in the demands made on the Division under forest management is an added reason why such a man should be provided.

PUBLICITY IN FOREST WORK.

Another way in which the Division of Forestry is of service is by taking advantage of all convenient opportunities to bring to the attention of the people of the Territory statements in regard to the principles of forestry, reports of work in hand, and the reasons why certain policies are advocated and pursued. When so large a part of the forest work done in Hawaii is and must be carried out under private auspices it is advisable that a share of the attention of the Territorial Division of Forestry be given to making better known the precepts of forestry and the reasons that underlie them. The man who cares for a tract of native forest intelligently, or who starts a grove of thrifty trees, benefits not only himself but an ever-widening circle of his neighbors throughout the Territory. In view of the close relation between forest protection and the continued success of agriculture in Hawaii, and because of the steadily growing demand for wood of all kinds, it is not only desirable—it is essential that the citizens of Hawaii be brought to understand and practice forestry. It is for this reason that reports are written and speeches made. The development of a better understanding of what forestry is and what it does justifies the time and labor expended.

During 1908 in furtherance of this idea two popular lectures on forestry were given in the spring at the College of Hawaii; papers telling of the progress of forestry were prepared and read before the annual meeting of the Hawaiian Sugar Planters' Association and of the Hawaiian Rubber Growers' Association in November; and numerous reports and other contributions written for the Hawaiian Forester and Agriculturist and for the various newspapers. In January, 1908, an exhibit illustrating the work of the Division of Forestry was made at the Third Annual Exhibit of the Hawaiian Poultry Association.

Whenever a forest reserve is set apart the reasons for its creation are outlined in the report of the Superintendent of Forestry. These reports, with the recommendations of the Committee on Forestry, are always published in full in the Hawaiian Forester and Agriculturist, the official organ of the Board of Agriculture and Forestry, in which magazine are also to be found special contributions and other miscellaneous reports on forest subjects. Perhaps deserving mention here is an exhaustive report on "The Forest Situation in Hamakua," published in the Forester for

April, 1908, in which are stated at length the reasons why it is not considered wise at this time to recommend that an extensive forest reserve be created in the Hamakua District, Hawaii. That report also includes a discussion of the much mooted question of the influence of forest on rainfall, with especial reference to the forests of Hamakua. The report was the result of several visits to Hamakua, and immediately followed a final investiagtion, made in February, 1908.

TERRITORIAL CONSERVATION COMMISSION.

The Conference of the Governors.

Mention was made in the opening paragraphs of this report of the important role played by the Conference of the Governors in the history of forestry in the United States in 1908. It is of interest to record here that Hawaii had a direct part in that memorable gathering. In response to the invitation of President Roosevelt, Governor Frear attended the Conference and took with him as his three "Advisors," Honorable W. O. Smith, Mr. Alonzo Gartley, and the Superintendent of Forestry.

To have attended the Conference of the Governors and not to have come back to one's regular duties with a broader outlook and with renewed enthusiasm would be an impossibility. The uplift of that meeting will ever remain as a powerful incentive to all who were fortunate enough to have a part in it.

During my stay in Washington I was able to get closely in touch with phases of the recent work of the United States Forest Service that have developed so rapidly as to be hard to follow from a distance. Conference on professional subjects with Forest Service men and with several of the other State Foresters whom I met in Washintgon or elsewhere in the East, was not only an agreeable experience, but gave me much to bring back to my work here that is of direct benefit to the forest work of the Territory.

Incidentally it may be of interest to note a fact perhaps not generally known, that Hawaii is one of the eleven states in the Union to employ a professional forester.

Appointment of Conservation Commission.

On July 23, 1908, Governor Frear appointed as the "Territorial Conservation Commission of Hawaii," the following persons: Messrs. Ralph S. Hosmer, Chairman; W. O. Smith, Alonzo Gartley, Jared G. Smith and Walter F. Dillingham—the three first named being the Governor's "Advisors" at Washington.

In accordance with the instructions of the Governor, the Commission immediately took up an investigation of the natural resources of the Territory with a view to recommending plans for their wise development and rational use. A preliminary report, with recommendations, was prepared and submitted to Governor Frear just prior to his departure for Washintgon early in November. This report, which contains some statements of fact not before available, is given in full elsewhere in this volume. It was first published in the Pacific Commercial Advertiser of Honolulu, then in the December issue of the Hawaiian Forester and Agriculturist, and generally distributed.

The Commission is in close touch with the National Conservation Commission and stands ready to coöperate with the Conservation Commissions of other states and territories. From time to tion as occasion may arise the Commission will bring to the attention of the Governor facts and figures of interest in connection with the use and conservation of natural resources, with recommendations in regard thereto.

The members of the Commission will be glad at any time to receive suggestions and communications pertinent to the subject in hand from any one interested.

Visit of Honorable F. H. Newell.

The event of greatest importance in Conservation matters in Hawaii during 1908 was unquestionably the visit to the islands in the autumn months of Honorable F. H. Newell, Director of the United States Reclamation Service. Following almost immediately Secretary Garfield's return to the mainland it shows that Hawaii's claims for recognition are not only being heard but responded to from Washington. Already Mr. Newell has been of signal assistance to the Territory in getting the plans for a hydrographic survey definitely under way. The coming year will see no small development along that line. All of which leads to making Hawaii a better place to live in and consequently to its development as a true American community.

At the invitation of the Governor the Superintendent of Forestry accompanied Governor Frear and Mr. Newell on a portion of their tour of the other islands, going with the party to Molokai and Kauai. On these trips it was possible to discuss with Mr. Newell a number of forest problems on the ground. Needless to say, many valuable suggestions was one result of these informal conferences.

BOTANICAL COLLECTION.

In October, 1908, Mr. Joseph F. Rock was engaged by the Division of Forestry as Botanical Assistant. Mr. Rock's duties are to gather herbarium material and seeds of Hawaiian plants needed for exchange purposes. Particular attention is paid to the arborescent flora, including trees, shrubs and woody creepers, but it is hoped that eventually the Herbarium may include specimens of all the native and introduced plants.

During the months of November and December there were collected on the Island of Oahu 1,506 specimens. The number includes duplicates for exchange as well as original specimens for the Herbarium. Roughly classified there were of

Trees and shrubs	1,016
Cryptogams	280
Algae	210
	1,506

The number of species of Phanerogams is 202; of Cryptogams 120; of Algae 146; a total of 468.

The best and rarest specimens of indigenous Hawaiian plants were collected in the Koolau Mountains between Kahana and Laie; especially on the main ridge of Punaluu and Kaliuwaa.

Although the season was unpropitious for collecting seed some was obtained from plants of the following genera: *Pithosporum, Myrsine, Lobelia, Darboutia* and *Pritchardia.*

It may be in place here to mention that there has also been added to the Herbarium a collection of Algae, Hawaiian sea weeds, "Limu," collected by Mr. Rock previous to his connection with the Division of Forestry. Many of these are edible and consequently have some local economic importance. In order to display certain of these Limu and other botanical specimens having popular interest, a standard with swinging frames has been constructed and placed in the Exhibit Room in the Board building, in which specimens of sixty different plants, properly named and labelled, are shown in a way to attract attention and facilitate study.

A forest herbarium is the necessary foundation for any sytematic investigation of the native Hawaiian forest. Such a detailed study must in time follow. For to devise plans for the most efficient handling of the Hawaiian forest reserves requires an intimate knowledge of the habits and life histories of many species. The study of the relations between the various members of the complex plant family that together make up what we term a forest is one of the problems that awaits attention. The collection of an herbarium is a help toward its solution.

FUNGUS DISEASE ON MAUI.

During the year 1908 not as much progress as could be wished has been made toward the control of the trouble, presumably due to a fungus disease, that is causing serious damage to the forest on the windward slopes of Mt. Haleakala on Maui. Believing that the first step necessary was to find out the exact cause of the trouble, arrangements were made for a thorough examination of the forest by one of the staff of the Division of Vegetable Pathology of the Hawaiian Sugar Planters' Association Experiment Station. This investigation is now in progress. As yet there is nothing to report.

In the expectation of subsequent planting to reforest certain of the areas where the native Hawaiian forest has been killed, the Division of Forestry is now in correspondence with its exchanges in regard to securing trees and shrubs similar in ecological character to those of the original forest. Heretofore, most of the importations of forest trees into Hawaii have been made mainly with the idea of planting for commercial return. In the present instance watershed protection is the need. It is expected that some desirable plants can be secured in this way and that practical results will follow their planting.

ARBOR DAY.

The annual celebration of Arbor Day is now firmly fixed in Hawaii. This year the date set by proclamation of Governor Frear was Friday, November 13. As usual Arbor Day was primarily an occasion observed in the schools, but not a little tree planting was done by individuals as well.

Through the coöperation of the Department of Public Instruction the largest number of trees ever sent out for Arbor Day planting—5,777—was furnished free from the Government Nursery to 71 schools. The planting this year was along the roadsides approaching the schools, most of the school lots having been planted with a sufficient number of trees in earlier years.

In addition to the trees given out free to the schools, there were also distributed from the Government Nursery, freight prepaid to the other islands, free trees for homestead planting. Each homesteader who responded to a general offer was given fifty trees. The trees offered were Swamp Mahogany (*Eucalyptus robusta*), Silk Oak (*Grevillea robusta*) and Ironwood (*Casuarina equisetifolia*). Lots could be made up of a mixture, or be all of one kind, as the recipient preferred. In all 9,926 trees were sent out. This Arbor Day distribution of trees is distinct from the routine work of the Government Nursery, the details of which are outlined in the report of the Forest Nurseryman.

NUUANU AND TANTALUS FORESTS.

There is no startling news to report from either of these planted forests during the year, except that with the final decision of the Lanai suit the title to the Tantalus Forest definitely passes, without question, to the Territory. This will permit the undertaking during the early part of 1909 of much needed thinings, and the clearing out of dry underbrush that greatly increases the fire danger.

The one forest ranger so far appointed, David Kapihe, has continued during the year to patrol the Tantalus Heights District and to oversee the burning of brush under permits issued by the District Fire Warden.

RUBBER INVESTIGATIONS.

THE PRESENT STATUS OF RUBBER IN HAWAII.

The production of rubber has come during the year 1908 to take its place as one of the recognized industries in Hawaii. This desirable position has been reached through the successful completion of a series of systematic tapping tests which proved that rubber can be collected and prepared for market from the trees in the rubber plantations on the Island of Maui at a cost that insures profitable returns—the work being done by ordinary laborers under conditions that would obtain in actual commercial practice. This experimental tapping is part of a coöperative investigation now being conducted jointly by the Division of Forestry and the Hawaii Experiment Station.

THE TERMS OF THE EXPERIMENT.

It may be recalled that in 1906 during an investigation by this Division of the planted forest on Kauai there was brought to public attention the existence of two groves of Ceara rubber trees on that island. Arrangements were at once made to tap these trees, the work being undertaken by the Hawaii Experiment Station, as that Station then had a man available for the work and the Division of Forestry did not. The results of the tests made on Kauai, with other matters germane to the subject, were published during the spring of 1908 as Bulletin No. 16 of the Hawaii Experiment Station. That bulletin is an important contribution, but it does not answer all the questions involved, particularly the crucial one of whether rubber can be collected at a cost that justifies the industry as a commercial proposition. To meet this need the Division of Forestry proposed to the Hawaii Experiment Station that a joint investiagtion be undertaken: the Experiment Station to provide the men to do the field and laboratory work, the Division of Forestry to pay the bills. Twelve hundred dollars has been alloted for this purpose. The Directors of the four rubber plantations at Nahiku, Maui, cordially endorsed the plan and have actively coöperated by giving the agent in charge the right to tap the requisite number of trees and by furnishing laborers to work under his direction.

From the start the experiment was planned with special reference to securing figures that should have direct practical bearing on the commercial development of the rubber industry. To attain this result there was kept constantly in mind in planning the tapping tests the conditions that the rubber plantation manager must face daily in actual practice. To this end it was arranged that there should first be tried only the simplest possible methods of tapping, such as any laborer of ordinary intelligence could learn to do, and that all refinements of process, at the start be done away with. It was further provided that any given tapping test should be made on a large enough number of trees to be really representative and that each such test should be continued as long as the size of the trees warranted. Another provision of the same order was that an accurate record be kept of the time of all laborers employed, in units of not less than one-half of an actual working day—the experiments being so planned as to keep the men busy during that time.

In working out the details of the experiment the plan broadened somewhat in scope so that finally it fell under four main heads, as follows:

First. Experimental tappings to determine the cost of collecting latex under conditions of commercial practice.

Second. Comparative tests of different methods of tapping to ascertain which one is best adapted to the local conditions, in view of cost, time required, effect on the flow of latex, and general influence on the tree.

Third. A study of the methods of handling the latex after it has been collected, with special reference to control by chemicals or by other means, so that as large a percentage as possible may be sold as high grade rubber. The best way of handling the "scrapings" is an important phase of this problem.

Fourth. A study of methods of cultivation and fertilization, to find out how through these means rubber trees may be brought sooner to the point of tapping, or by increased vitality be made to yield larger quantities of latex at an earlier age or for a longer period of flow.

Along with the main points enumerated much information will also be got on such related matters as the best spacing of the trees, the appropriate season of the year for planting, intercultural crops, and the like. The work under the third head, methods of chemical control, will be performed at the laboratory of the Hawaii Experiment Station in Honolulu as it is of a character requiring special equipment and knowledge only possessed by a trained chemist. There are enough rubber trees on the station grounds and in the Tantalus forest to provide the necessary latex. All the rest of the work will be done in the field on the several rubber plantations at Nahiku, Maui. The experiments were started early in October; they will be continued during the remainder of this fiscal period.

The two important points on which the success of the rubber industry in Hawaii turns are first, whether the trees yield latex in commercial quantities, and second, whether the latex can be collected and prepared for market at a profit. Even in its initial findings this experiment has gone a long way toward answering these questions.

RESULTS OF THE TAPPING TESTS.

At the second annual meeting of the Hawaiian Rubber Growers' Association held at Honolulu on November 20, 1908, Dr. E. V. Wilcox, Director of the Hawaii Experiment Station, told of the results of the experiment so far as they had then been obtained. After the meeting he prepared a written statement, embodying the essential facts. This statement, reprinted from the Hawaiian Forester and Agriculturist for December, 1908—which number contains a full account of the Rubber Growers' meeting—is as follows:

Results of Experiments in Tapping Ceara Rubber Trees.

[Statement by Dr. E. V. Wilcox at the Hawaiian Rubber Growers' Association Second Annual Meeting.]

"The rubber experiments which are being carried on by the United States Experiment Station and the Territorial Board of Agriculture and Forestry have been under way long enough to indicate certain results which are of practical importance to rubber growers. Thus far more than 200 trees, most of them less than three years old, have been tapped. These trees averaged from twelve to thirteen inches in circumference and were located chiefly on the grounds of the Koolau Rubber Company, on Maui. In tapping young trees it was not expected that profitable returns of rubber would be obtained; but the plan involved the practical point of determining the rapidity with which trees could be tapped, and satisfactory methods of handling labor to the best advantage.

In the first series of 80 trees, which were tapped by means of one vertical cut each day, it required thirty-six hours and forty minutes of labor to tap the trees, collect the latex, and secure 1½ pounds of dry rubber. In the second series of experiments on 160 trees, which were tapped with two vertical cuts instead of one, it required only forty hours of labor to tap the trees, collect the latex and obtain five pounds of first class rubber and about a pound of scrap rubber. In this experiment in which two vertical cuts were used daily, profitable returns were obtained.

"It was found that an ordinary laborer could tap rubber trees, by means of two long, vertical cuts, at the rate of about 50 trees an hour, and could collect latex at the rate of 100 trees an hour. The available labor on plantations appears to be reasonably effective in doing this work, and the amount of training required in order to make the cuts effectively and quickly is not excessive.

"It requires less time to tap older trees than the young trees, upon which our work is done, and there is also less danger of injuring the trees. We have found that a good flow of latex can be obtained from tapping done from daylight until 8 a. m., or even later.

"From the experiments which we have thus far conducted it appears that one man can tap about fifty trees per hour, while another man can collect the latex from the trees which would be tapped in the same time by two men. Since it appears from results which we have obtained from tapping mature Ceara rubber trees, that about one-third ounce of dry rubber may be expected as a daily yield, it is evident that three men should be able to obtain rubber from mature trees at the rate of about one pound per hour. The data upon which this conclusion is based have been carefully considered and the estimate is probably not above what may be expected. At any rate, the results obtained in our experiments indicate clearly that the Ceara rubber tree in Hawaii will not only grow and thrive, but will yield profitable returns.

"Further experiments will be carried on in the microscopic examination of sections of the Ceara rubber tree to get a basis for determining the best methods of tapping. Several other species of rubber trees will also be tapped and an elaborate series of fertilizer experiments with rubber is planned. We hope to be able to devise a method of fertilizing rubber trees so as to secure an increased flow of latex during the tapping periods."

MR. WATERHOUSE'S REPORT ON RUBBER.

In October, 1907, Mr. F. T. P. Waterhouse of Honolulu was appointed a Special Agent of the Board of Agriculture and Forestry to investigate the rubber industry in the Malay Peninsula and Ceylon. On his return from the Orient Mr. Waterhouse prepared an interesting report of his findings, which was printed jointly by this Board and by the Hawaiian Rubber Growers' Association. The report appears in full in another part of this volume.

THE DISTRICT FORESTERS.

During the past year only one change has taken place in the personnel of the volunteer staff of District Foresters and District Fire Wardens, the resignation, on account of removal from the Territory, of Mr. C. B. Wells of Wailuku, Maui. He is succeeded by Mr. H. B. Penhallow, also Mr. Wells' successor as Manager of the Wailuku Sugar Company.

The boundary line between the districts of Messrs. Munro and Conradt on the Island of Molokai has been altered to effect a better division of the island and to facilitate supervision. Mr. Munro now has all of the island lying to the west of Wailau Valley and the land of Mapulehu. Mr. Conradt's district includes these lands and all to the east of them.

Revised lists of the District Foresters and District Fire Wardens are given on another page of this report.

REPORTS OF DISTRICT FORESTERS.

Following the usual custom opportunity was given each of the District Foresters to record briefly notes of forest happenings in his district during the year or other matters worthy of record. The following abstacts are from the answers received:

Mr. A. F. Knudsen—Waimea, Kauai.

"In reference to the planting of *Acacia melanoxylon* at Halemanu in the Waimea (West) Forest Reserve, I would like to report that from the same sowing of seed in 1906, several young plants came up in the month of December, 1908, and were observed by me in January, 1909.

"These seeds were scattered broadcast and quite a number came up after the first rains. The spot was marked with a stake and by the first comers, now about 5 feet high. In that same plot this year about 25 more have come up and seem to thrive. It is impossible that these come from any other seed than those sown in 1906."

Mr. Francis Gay—Makaweli, Kauai.

"As Forester for the Waimea section of Kauai, I beg to report to you that our forests are in better condition than they have been for some years past owing to the killing off of wild cattle, and the young trees are coming up everywhere and notwithstanding the very dry season we have had our forest is in fine condition.

"The only tree I find that is at all touched with blight, is the Aiea, but the blight on it seems to be going off, and I hope will soon disappear entirely.

"Our lower lands are already covered with Algaroba where cane is not grown so we have done very little tree planting in this section this year.

"I find that the rubber plants you gave me which I planted upon the government section, have hardly grown any, and I believe that the land is too dry for rubber.

"There have been no fires in our forest reserves this year, but several on our pasture lands owing to the very dry state of the grass, but all have been promptly extinguished.

"We still keep in force our old fire law, which works well; that is that all who assist in extinguishing any fire get $1.00, which is paid by the person who starts the fire, so that all who see a fire hasten to it and there is generally no trouble in extinguishing it before it goes too far."

Mr. John Herd—Koolaupoko, Oahu.

"In compliance with your request I herewith submit a report on forestry conditions in this section for the calendar year 1908. The only matters of special interest to report in this connection are the continued plantings on the Maunawili Ranch, as well as the starting of a coconut plantation on a section of Kailua near the sea. All these plantings may, however, be regarded to a very great extent as agricultural propositions, particularly as the large majority of trees planted in the Maunawili section have been rubber of varied varieties, and those at Kailua, coconuts for future agricultural purposes. The total number of all kinds of trees other than rubber planted at Maunawili Ranch during the calendar year amounted to 4,536, covering in all about 60 acres distributed as shelter and windbreaks, as well as for ornamental purposes.

"I would again call your attention to the decay in the native forest trees in this section, particularly "*Acacia koa*," which continues to suffer from the attacks of Lepidopterous larvae, which destroys all seeds as well as the young twigs. Avocado Pear trees have practically all been destroyed in this district by a fungus disease, as well as attacks by species of borers, for some years past. The fruit of the Mango tree continues also to be attacked by a species of fungus, few of these coming to maturity. Ohia (mountain apple) trees continue producing much dead growth from the top of the trees, which, as previously reported, is also supposed to be the result of fungus attack.

"It is quite important that these various fungi and other troubles be properly investigated by scientific men who are competent to undertake such systematic as well as economic work. Nothing of any moment has been done in this direction, and unless improvement as to present conditions occurs in the near future, it will be practically useless to make further plantings of very many varieties of trees which have heretofore been quite suitable to this section of country from an economic standpoint."

Mr. H. B. Penhallow—Wailuku, Maui.

"*Forestry:* Of particular note is the establishing of a forest nursery early in the year by the Wailuku Sugar Company. It is the intention of the plantation to set out with suitable trees certain lands at Waihee and Waikapu which cannot be planted to cane, and the lands immediately above the cane fields. The chief object is to establish a source of supply for fire wood, fence posts and railroad ties. In addition to the above, the camps are being provided with shade and fruit trees, and certain localities with wind breaks.

"Owing to the lack of rain no planting was done until October, but by the close of the year over four thousand trees were set out.

"*Forest Trees:* Excepting a small grass fire in the mountains above Waihee on February 19th, 1908, started by a demented Hawaiian, we were free from any fires, that threatened the forests, notwithstanding the particularly dry weather experienced throughout the year."

Mr. L. von Tempsky—Makawao, Maui.

"I have planted this last year some 19,665 trees. Owing to the unprecedented drought which we passed through (which entailed watering some ten thousand trees) the expense was greater than in former years, and also, I have been trying the planting of trees in cultivated land, as against the ordinary furrow and kipikua method, which of course entails a larger outlay at first, but which I think from the quicker growth obtained will in the long run prove the cheaper plan of the two.

"In September, 1907, I measured off a rectangular piece of land containing exactly four acres. One acre I furrowed out, and "kipikuaed" holes six feet each way. The other three acres I plowed and harrowed twice, and as the Manienie sod was very heavy I had to hand work the whole piece, going over it with 'kipikuas' and packing out what wouldn't burn. As the weather was quite wet I could not get a fire on the grass prior to plowing; this of course made the preparation of the three acres very expensive. I selected this spot especially as I thought it would be a good place to determine the maximum cost of preparing land for planting trees in this style.

"The seedling trees I selected were, *Eucalyptus amygdalina, E. botryoides, E. corymbosa, E. corynocalyx, E. leucoxylon, E. paniculata* and *E. rudis,* which were recommended to me by the Australian Forestry Service as being considered by them to be among the best of their trees for railroad ties and fence posts.

"The cost of the two pieces is as follows:

One Acre Lot.

Furrowing	$ 2.60
Holeing	3.60
Planting	2.60
Weeding to date (twice)	9.60
	$ 18.40

Three Acre Lot.

Plowing	$ 16.09
Harrowing	3.15
Kipikua work and twice weeding	102.70
Holeing	17.44
Planting	7.52
	$146.90

Or $48.97 per acre.

"The holeing of the three-acre piece cost more than it should have done, as owing to running out of seedling trees, planting of about half this lot had to be postponed, and the holes dug over again.

"To offset to a certain extent the cost of the three-acre lot, I thought it would be as well to try some quick growing crop that would not take up too much room, and would to as small an extent as possible retard the growth of the trees. I selected California potatoes, and treated the seed to a bath of sulphate of copper, to see if that would prevent the rot that is so prevalent in Kula.

"Last July notwithstanding the rot that did attack them, and the exceptionally dry weather that we have had all this year, I took off a crop of potatoes that netted me $69.19. This amount deducted from the cost, $146.90, left $77.71, or say $25.90 per acre, for the three acre apiece, as against $18.40 for the uncultivated acre.

"One year from planting the trees the following measurements were made:

"The tallest tree in the uncultivated lot was 5 feet 3 inches, a *Eucalyptus botryoides,* and the average height of the whole of that piece was 3 feet.

"In the cultivated lot the tallest tree measured 16 feet, *E. rudis,* the other tall ones being: *E. botryoides,* 15 feet; *E. corynocalyx,* 12 feet; *E. leucoxylon,* 12 feet; *E. paniculata,* 12 feet; *E. corymbosa,* 6 feet.

"The best average height; and the evenest grown lot of trees was the *E. botryoides;* the poorest being the *E. corymbosa.* The average height of the whole three-acre lot was over 10 feet. One stray Blue Gum, *E. globulus,* that was accidentally planted in the cultivated lot measured 12 feet in height. This tree had exactly the same treatment the others had, which goes to show pretty well, that both *rudis* and *botryoides* are faster growers than the *globulus*; both these species are ranked very highly in Australia for railroad ties and fence posts. This is well to be known, especialy as the *E. globulus,* or Blue Gum, is the Eucalyptus most commonly grown at the islands, and except for firewood, is the poorest for any purpose.

"Considering the unusually dry weather we have had for the last twelve months, I consider the growth of the trees in the cultivated lot remarkable.

"Under normal conditions, that is, where there is not a heavy growth of Manienie to contend with, the cultivation of the trees should cost very much less than the amount above shown.

"The difference in favor of the cultivated as against the uncultivated trees is so great in favor of the former, that I shall favor the cultivation of all trees hereafter planted on the ranch, wherever the location is such as to make it possible.

"As showing what the possibilities are of fence post production, I would call attention to figures heretofore reported, viz: That last year I cut 244 good fence posts, five to twelve inches in diameter, from 38 second growth *Eucalyptus rostrata* trees, twelve years old. Some of these posts have been put in the ground plain and the balance subjected to creosote treatment by the Kahului Railroad Company. All of these posts will have the date stamped on them, and the place of use recorded in the Ranch Forestry book, so that their respective life in the ground can be ascertained accurately.

"I have adopted a method of planting this year that will in time to come prove very useful as a means of identifying the various species of Eucalypti that I am now growing for railroad ties, fence posts, etc., etc.; that is, planting them in alphabetical order according to their names, from mauka, makai. And as the lots in which they are planted are numbered, and the varieties recorded in the Ranch Forestry book, my successor in future years will have something tangible to work on.

"For instance, Lot No. 7, Kula Homestead Road, has planted in its upper or mauka lines the *Eucalyptus amygdalina,* next to it comes *Eucalyptus botryoides,* then *E. Crebra, E. gunnii, E. paniculata, E. polyanthema, E. rostrata, E. rudis* and *E. siderophloia,* which occupies the lower, or makai, lines in the lot.

"These varieties are what I am confining myself principally to planting, as they are all of known value in Australia for railroad ties, fence posts, etc., etc., and they are nearly all rapid growers, more especially so the *E. botryoides* and *E. rudis.*

"The latter part of 1908 I planted another cultivated lot of four acres of Eucalyptus; in this lot, between the tree rows, I propose to plant soyo beans, with the object of reducing the expense incurred and cultivation; results will be reported later on.

"The *E. siberiana* that I planted at an elevation of 6,000 feet promise well, and from what I can learn of this variety, should be well suited to the higher altitudes of the islands.

"I have also planted an avenue of *Cryptomeria japonica* (along the road mauka of the ranch house, about three-quarters of a mile in length) which promises to make a fine showing in a few years time.

"The pines, outside of *Pinus canariensis,* have been very disappointing; there must be something connected with their cultivation that I have yet to learn, as I have no luck with them at all. I am now trying planting them in the ground in the nursery out of the boxes, where I propose to keep them till they are two years old before moving to their permanent resting place."

Trees Planted by the Haleakala Ranch Company During the Year 1908.

Eucalyptus amygdalina	17,305	Planted at from 2,500 to 3,000 feet elevation
" *botryoides*		
" *crebra*		
" *gunnii*		
" *paniculata*		
" *polyanthema*		
" *rostrata*		
" *rudis*		
" *siderophloia*		
" *siberiana*	550	Planted at 6,000 feet elevation.
Sequoia gigantea	10	Planted at 2,500 feet elevation.
" *sempervirens*	100	Planted at 2,500 feet elevation.
Cryptomeria japonica	900	Planted at 2,000 feet elevation.
Pinus ponderosa	800	
" *jeffryi*		
" *canariensis*		
" *insignis*		
" *coulteri*		
	19,665	

MAUI AGRICULTURAL COMPANY'S TREE PLANTING.

In connection with the planting on Maui special mention may well be made of the active interest in tree planting shown by Messrs. David T. Fleming and William Hannestad, the two men on the staff of the Maui Agricultural Company charged with the duty of growing and planting trees. Mr. Fleming has the section in and about Haiku; Mr. Hannestad the lands at a higher elevation from Kailiili to Opana.

At Kailiili Mr. Hannestad has been able to use successfully methods in the nursery and in planting out the trees, which though common in the temperate zone have been shown by experience to be impracticable in lower and drier sections in this Territory. It is a matter of no small importance to know where seed beds can be used to advantage and forest planting done with transplants, for by these methods the cost of planting can in many cases be materially lessened.

Mr. George C. Watt—Kohala, Hawaii.

"In reply to yours asking me for a report on the conditions of forestry work in the Kohala District, I would say that nothing of interest has taken place during the past year. The Kohala Sugar Company still continues planting trees in waste places. Last year we planted for wind breaks about eighteen acres of gulch sides.

"I enclose a letter to me from Mr. P. W. P. Bluett, Superintendent of the Kohala Ditch Company, which I asked him to write describing the condition of the Kohala Forest, he having spent the greater part of the last three or four years in the Kohala Mountains and is eminently fitted to give a description of the forest in the Kohala Mountains.

"I think it highly desirable that these Kohala Forests should be made a Government Reservation and that with the least possible delay."

Mr. Bluett's Report on the Kohala Forest.

Kohala, Hawaii, January 14, 1909.

"G. C. Watt, Esq.,
Kohala.

"Dear Sir:

"In writing you, at your request, a letter describing the condition of the Kohala forest as I have most recently observed it, I will endeavor to put the matter in as concise a form as possible. Let me premise by saying that, during the past year, I have, in the interests of the Kohala Ditch Company, investigated the sources of all the streams supplying the Ditch, traversing, during this period, the entire watershed from Waimanu to Puu Pili.

"One of the first features to attract attention in the upper elevations is the absence of living timber of large size and the presence of very numerous skeletons of what were once giant trees. On the other hand, trees of smaller growth, principally Ohia, are plentiful and vigorous and, in places which have not yet been penetrated by cattle, young and healthy shoots are numerous. In considering the effect of the forest on the watershed I was greatly impressed by the importance of the part played by the heavy underbrush, extending as it does, almost over the entire area. Pulu ferns of great size combined with smaller varieties and matted masses of vines, form an ideal break to the great quantities of water which, during heavy rains rush down the slopes of the Kohala Mountains, disseminating this water over the flats of large area which are so frequently to be met with, and which, by the absorption, at frequent intervals, of large quantities of water become the swamps in which all the streams and springs forming the water supply of North Kohala have their source.

"The preservation of this underbrush appears to me to be of equal importance with the maintenance of the trees, but, in certain sections of the forest the destruction of both is going on simultaneously, and more particularly on the Kohala side where it is apparent that the western boundary of the forest is receding rapidly. Places, which, a few years back, were deep swamps, covered and surrounded with dense vegetation, are now open country, over any portion of which a heavily laden wagon may be driven. The causes producing these destructive effects are, according to my personal observation as follows: (1) Cattle, (2) pigs, (3) insect pests. Both wild cattle and pigs are present in the western portion of the forest in large numbers, the latter being so prolifiic that it is not uncommon to run across several litters in one day.

"Both classes of animal are destructive in the same way, i. e., by the consumption of the underbrush and the roots and bark of young trees for food and by the tramping down of vegetation and the bruising and exposure of the roots of trees. In many places the trails of these animals form a perfect network and afford channels for the passage of water and consequent erosion of the soil at the base of the trees. In regard to the third cause, I am unable, through lack of knowledge of the subject, to say what particular variety of insect is responsible for the damage, but the effect is rendered obvious by an examination of the dead trees, some of which are absolutely honeycombed with holes. The section of the forest which, at present appears to be in the best state of preservation is that portion between Honokane Nui and Waimanu, where it is, in all respects, denser and more vigorous.

"In this section, at the lower elevations (2,000 to 3,000 feet) the Loulu palm is comparatively plentiful, but many fine specimens have been cut down in the past by persons wishing to obtain the young leaves for straw making purposes. Still lower I have found a few solitary specimens of the sandal wood tree, of the true variety, but all in a state of complete or partial decay, caused by some boring worm which also attacks and destroys the seed on the ground.

"At the eastern extremity of the Kohala Mountain range and at an elevation of approximately 5,000 feet there is quite an extensive patch of Mokihana which, heretofore, was not supposed to exist in this region, and which, I am informed, is supposed to grow only on Kauai.

"In conclusion I would say that, should you or any one interested in the preservation of the forest, wish to make a visit of investigation to that section of the country I shall be most happy to have you accompany me on one of my frequent trips.

Yours very truly,

P. W. P. Bluett,

Superintendent, Kohala Ditch."

Mr. John Watt—Puna, Hawaii.

"Forest conditions have not changed materially since my last report. There are one or two items which may be of interest to your Board which I will mention at this time.

"The Hawaiian Mahogany Lumber Company have logged about 400 acres of forest adjoining the cane fields of Pahoa; also from 50 to 100 acres of forest land at Kaohe Homestead. This land will be all available for agricultural purposes, and will, undoubtedly, be planted to sugar cane in the near future.

"The Pacific Development Company have planted a considerable area of land cleared of forest to rubber trees in the Puna District, between Pahoa and Kapoho. I understand these trees are growing remarkably well.

"*Fires:* There have been no forest fires during the past twelve months. A great number of fires have been started from time to time on the Pahoehoe lying between the Olaa Sugar Company's fields and the cane fields of the Puna Sugar Company. As the forest on this country is very sparse and the trees small, little or no damage has been done in this respect; but these fires are a great menace to landowners cultivating cane adjoining the Pahoehoe."

Mr. R. von S. Domkowicz—South Kona, Hawaii.

"I may mention that I made some trials of raising various kinds of pine trees from seed such as your Department furnished us, but it has not been a success. But such trees as Cryptomeria japonica and various Cypresses are doing very well; climate and soil seems to be especially adapted to them."

Mr. John Maguire—North Kona, Hawaii.

"There has been very little forestry work in my district during 1908.

"The planting of trees is a matter of chance in this district. If the weather is good and we have a rainy year, then the young trees will get a good start.

"Mr. Frank Greenwell has planted on his place at Honokohau between 70 and 80 rubber trees from a few months to a year old and averaging from 2 feet to about 5 feet. This has been an exceptionally dry year, so that the trees have not had a fair start. Honokohau is in what we consider the rainy belt, the average rainfall there being about the greatest in the North Kona District.

"At Puuwaawaa, over 500 seedlings of all kinds of trees have been ready for planting out, awaiting good rains, but they have gradually diminished, owing to the scarcity of water, and some having grown through their containers were planted out and consequently died.

"The rainfall for the year 1908 at Puuwaawaa was 8.20 inches. The greatest fall in March, 3.08 inches, and the least in December, nothing at all. In January, 1908, there was .08 and in June .04.

"I notice in the record of rainfall kept here at Huehue the last eight years, and the amount decreases farther north on the slopes of Hualalai, that every other year there is a small record. The record of rainfall at Huehue, an elevation of 2,050 feet, has been as follows:

In 1901	51.76	inches
In 1902	43.13	"
In 1903	29.11	"
In 1904	59.84	"
In 1905	22.44	"
In 1906	44.38	"
In 1907	37.17	"
In 1908	19.18	"

"The section of Honuaula under reservation is doing well—the undergrowth already making a good showing."

FOREST FIRE SERVICE.

Notwithstanding the fact that the year 1908 has witnessed severe droughts in many districts of the Territory, the record in regard to forest fires is a most satisfactory one. Practically no damage has been sustained through forest fire, for in every case where a fire has started it has been quickly checked and extinguished. Just how much this is due to the forest fire law and to the better public sentiment in regard to forest fire that has been aroused thereby is hard to say, but probably not a little of the immunity from damage from fire is due directly or indirectly to the efforts that have been exerted under that law.

There is, however, one very pressing need in regard to forest fire that temporary immunity from injury should not be allowed to obscure. As it is now there is no money available from which men can be paid for fighting forest fires on unleased government land. Under the law owners and lessees of land are liable if fire escapes beyond their boundaries. This acts as an effective lever in causing active measures to be taken to have fires put out on the land they own or control. But it does not provide for fighting fire on unleased government land—that is, in the established forest reserves or on those unleased government forests that have not yet been included within reserve boundaries. There ought to be a special emergency fund of at least $5,000,00, to be drawn on only in case of need, to provide for this exigency. So long as there is no appropriation the Chief Fire Warden is practically powerless to take effective measures to stop fires that may start at any moment and do untold damage. This is an urgent need and should not be passed unnoticed by the Legislature.

List of Forest Fires During 1908.

Date 1908	Locality	District	Island	Area burned over	Character of fire	Origin
Feb 19	Waihee	Wailuku	Maui	....	Grass	Escaped brush fire
June 29	Waipio	Ewa	Oahu	....	Grass & brush	Escaped brush fire
Oct 28	Waialua Valley	....	Molokai	500	Grass & brush	Escaped brush fire
Nov 19	Waianae-uka	Ewa	Oahu	100	Grass	Cigar stump
		Kona	Kauai	Several grass fires		
		Puna	Hawaii	Several grass fires		

Periods of special fire danger have been proclaimed as follows: Tantalus Heights District, Oahu, twelve months from February 13, 1908—number of permits to burn brush issued, 21; Western end of the Island of Molokai, three months from September 28, 1908; Eastern end of the Island of Molokai, three months from November 3, 1908.

SUMMARY OF RECOMMENDATIONS.

The carrying out in a truly efficient manner of a program through which the forests of Hawaii can be made of greatest service to the people of the Territory requires an initial outlay in the way of appropriations for certain specific purposes.

The forests of Hawaii make possible the assured supply of water, without which the economic prosperity of the Territory would come to a stand still. Water from the forest reserves is now used chiefly in connection with the main industry of the Territory, the production of sugar cane. But as has repeatedly been pointed out, for the continued success of agriculture in Hawaii, whatever the crop, there must be water. This point of view has been especially emphasized during the past year by the authoritative statements made by Honorable F. H. Newell, Director of the United States Reclamation Service, during his trip to the Islands in the autumn months. An impartial opinion from such an authority is conclusive.

It is obvious that water is of crucial importance in the development of the Territory. Without the forests a continued supply cannot be maintained. Hawaii cannot afford not to make the forests do their full duty. And this can only be accomplished by providing the necessary men and means to bring the forests to the state of highest efficiency and to keep them there. Money invested in bringing the Hawaiian forests to their highest state of usefulness is as surely invested as if it went to buy high class bonds.

Succinctly the needs for which appropriations are asked are these: A forest ranger organization, a fund for fencing forest reserve boundaries on government lands, a special fund (to be used only in case of emergency) for fighting forest fire on government land, and provision for a technically trained assistant in the Division of Forestry.

It is further recommended that the law requiring that hunters pay a license fee (Act 116, Session Laws of 1907) be so amended as to allow the shooting of wild goats without a license, it being provided that permits be first obtained from local officials.

With provision made for its regular work and for these additional needs, the Division of Forestry will be in a position to render to the people of the Territory more efficient service than ever before. Money expended in bringing the forests to the point where they will do their full duty will surely be returned many fold in the increase in the prosperity of the Territory that is bound to follow a rational use of the natural resources.

Hawaii now holds, as for many years past, a prominent place in the sisterhood of States recognizing the importance of forestry and providing for forest work. It is not too much to hope that with the better understanding of the problems of Conservation that has characterized the past year, Hawaii will take an even higher place in that honorable company.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry and
Chief Fire Warden.

Report of the Forest Nurseryman.

Honolulu, Hawaii, December 31, 1908.

R. S. Hosmer, Esq.,
Superintendent of Forestry,
Honolulu, Hawaii.

Dear Sir:

I herewith submit a report of the work done at the Government Nursery, the Experiment Station, Makiki, the Nuuanu Station and the Tantalus Forest, including the giving of advice and assistance, for the year ending December 31, 1908.

NURSERY.

The collecting and exchange of seed have been continued and extra samples packages in addition to the list sent out a year ago, sent to those on our seed exchange list who asked for the same. Botanic gardens to the number of 17 have sent seeds and 10 have sent lists to select from. Altogether 248 packages of seed have been received through our exchange system. Many plants new to the Territory are being propagated at the Nursery and when large enough will be sent to the Experiment Garden in Makiki Valley.

VALUABLE INTRODUCTIONS.

Through the kindness of the Honorable A. de Souza Canavarro, Consul General for Portugal, who is much interested in economic plants, several consignments of seed of a grass known as Esparta (*Stipa tenacissima*) were handed to us to be propagated. We have successfully propagated about fifty plants from the seed received. Division of the root is said to be the safest way to propagate this plant, the growing of it from seed being considered difficult. The merits of this grass are well known, it being in great demand for paper making, also for ropes, baskets, mats, hats and other articles. The plants are doing well and they will be planted at the new Experiment Garden where they will be increased by root divisions, and in time distributed.

Another introduction which is worthy of note is the Mocha Coffee brought from Mexico by Mr. George R. Ewart, who handed the seed to us to be propagated. This coffee is said to be superior to any on the market and commands the highest price. Over

1000 plants were successfully raised from the seed and were distributed to people on the different islands of the group. Mr. Ewart drew up a list of people to whom he wished the plants sent, the Division of Forestry receiving a share. The plants given to the Division of Forestry will be planted and cared for at the new Experiment Garden.

The two new varieties of Manihot rubber trees, namely *Manihot dichotoma* and *Manihot piauhyensis,* the first to reach this Territory and of which mention was made in our last report, are doing well. A few plants of each kind were given to the Nahiku Rubber Company and the Hawaiian American Rubber Company in November, 1907. A few more trees of each kind were given to the two plantations mentioned in November of 1908. A small number of plants of each variety are still on hand and will be planted in the new Experiment Station, Makiki.

A number of other rare plants have been raised from seed and will be given a fair trial in the new Garden.

ARBOR DAY.

The number of trees ordered for the different schools of the Territory, to be planted on Arbor Day, November 13, was larger than it has been since Arbor Day was first proclaimed. Applications for trees were received from the principals of 24 schools on Hawaii, 10 on Kauai, 15 on Maui, 16 on Oahu, 5 on Molokai and 1 on Lanai; the total number of schools supplied with trees being 71, and the total number of plants sent out 5,777.

The offer to supply each of the homesteaders in the Territory gree of charge, with fifty trees for Arbor Day planting was taken advantage of by a large number of homesteaders and altogether 9,926 trees were ordered by them. Owing to the great demand for trees for Arbor Day planting it was found to be impossible to supply all the homesteaders with trees in time for Arbor Day, but each received the amount ordered as time permitted.

PLANT DISTRIBUTION.

The following is the number of plants given away, sold and sent out for Arbor Day, also gratis to homesteaders, schools, improvement clubs, parks and others:

	Forest.	Fruit.	Ornamental.	Total.
Arbor Day, Schools	3,700	..	2,077	5,777
" " Homesteaders	9,926	..	....	9,926
Gratis	1,150	50	960	2,160
Sold	13,052	32	3,552	16,636
	27,828	82	6,589	34,499

In addition to the above 20,000 seedling Ironwoods in seed boxes were sold to Paauhau Plantation Company; also 1,000 seed of Para Rubber (*Hevea brasiliensis*) and 1,000 seed of Central American Rubber (*Castilla lactiflua*) were propagated for the Puna Sugar Company.

The demand for forest trees has been larger during the past year than at any time in the past. All the plants sent out were first started in the two small propagating houses. The saving of seed owing to the protection given by these houses from ants, heavy rains, etc., has, I am sure, already saved more in seed and labor than the houses cost.

Considerable work has been done on the Nursery grounds. About 3,000 yards of soil were carted on to the grounds during the past two years to fill up the low-lying parts. Almost the whole of the ground has been graded and replanted in grass. Throughout the year we have had the use of two prisoners, kindly allowed us by Sheriff Henry, the use of which has helped us a great deal. I would therefore take this opportunity of thanking Sheriff Henry for his kindness in granting us the two men and for the interest he has taken in the work.

REALIZATIONS.

During the year there has been collected and deposited with the Treasurer of the Territory, as a Government realization, the sum of $354.12. The amount is itemized as follows:

Sale of plants	$291.87
Sale of seed	35.70
Sale of wood from Tantalus	10.00
Sale of Nursery material (paper pots)	1.60
Receipts for fumigating plants	14.95
	$354.12

CONGRESSIONAL VEGETABLE SEED.

A consignment of vegetable seed, consisting of over 6,000 packages, was received during the month of January from the Honorable J. K. Kalanianaole, and distributed to people all over the Territory, including all the public and private schools. A large number of homesteaders and others applied for seed by letter and quite a number called at this office in response to a free advertisement in the local newspapers. The interest in the growing of vegetables seems to be increasing and the demand for seed is greater every year. The quality of the seed is praised very highly by those who have used it and they are eager to get their share when the new consignment arrives.

ADVICE AND ASSISTANCE.

Awini Tract: Kohala, Hawaii.

During the month of February the writer visited the District of Kohala at the request of the Agents of the Kohala Sugar Company for the purpose of examining and reporting on a tract of land belonging to the Company, and known as Awini Tract. A report with recommendations was accordingly drawn up and a copy of same given to the Agents.

Paumalu: Waialua, Oahu.

In accordance with an agreement between Mr. James W. Pratt, Commissioner of Public Lands, yourself and Mr. Frederick Lyman, owner of Lot 6, Paumalu Homesteads, the writer was requested to proceed to Paumalu for the purpose of making an examination and report on the condition of the Forest Reserve in that section and particularly in regard to thinning, and removing dead trees. A report with recommendations was accordingly drawn up, copies of which were sent to Mr. Pratt and Mr. Lyman, the original being placed on file in this office.

Lower Pauhala: Waikele, Oahu.

During the month of October at the request of Mr. Weinrich, Manager of the Hawaiian Fiber Company, a visit was made to the Company's lands at Lower Pauhala, for the purpose of giving advice on the cultivation of fruit and other trees to be planted on this land. Locations best suited to the different kinds of trees were selected and recommendations regarding the best methods of propagating seed and planting the trees were made.

Half-way House Property: Nuuanu Valley, Oahu.

On October 16th, at the request of Mr. H. Rahim, a visit was made to the Franca property lately acquired by Mr. Rahim. The visit was made for the purpose of giving advice on selecting and planting trees for windbreak purposes, also on the planting and care of fruit trees, etc.

Honolulu Plantation, Oahu.

During the month of December at the request of Mr. George Ross, Manager of the Honolulu Plantation, a tract of land running along the top of the cane lands and lying between the elevations of 500 feet and 700 feet above sea level was examined. The examination was made for the purpose of giving advice in regard to the planting of trees on this tract. The information desired was given and Mr. Ross intends starting tree planting on the land just as soon as the weather is suitable.

In addition to the above, fifty-five visits were made to places in and around the city. These visits were made at the request of people who desired information on subjects connected principally with the planting, cultivating and pruning of trees.

EXAMINING THE TREE PLANTING, ETC., ON KAUAI.

From the 6th to the 16th of August the writer paid a visit to the Island of Kauai. The object of the visit was for the purpose of examining the tree planting that has been done and is in progress, also getting more familiar with the conditions so that better results may be obtained by the selection of seed plants suitable to the different soils and locations. Many inquiries come to this office from all over the islands regarding the best trees to plant in the different districts and locations. The questions asked include the growing and care of forest trees, trees for windbreaks, road and street planting, also the uses of the trees in regard to lumber after they come to maturity.

On the Kauai trip the following palces were visited: At Waimea the gardens of the Knudsen Brothers, Mr. Francis Gay and Mr. Aubrey Robinson. After leaving Waimea the tree planting done by Mr. Walter D. McBryde at Wahiawa was examined, also the water reserve known as "Papapaholoholo Spring Reserve." The tree planting done by Mr. Walter McBryde deserves much credit and is indeed a very good object lesson of what can be done in this line. The tree planting done by the Koloa Plantation was examined, also the extensive work that has been done in tree planting at Lihue Plantation, both the beach, also the highland planting being examined. Grove Farm was also visited and the tree planting done by the Honorable George Wilcox inspected. On this trip a great deal of information was gained which will be of value, especially so when applications are made for plants or seed.

WAIANAE KAI FOREST RESERVE, OAHU.

On August 29th the writer paid a visit to Waianae for the purpose of examining the tree planting that is being done on the Waianae Kai Forest Reserve by the Waianae Company. Mr. F. Meyer, Manager, accompanied the writer and pointed out the work that he is doing in tree planting. Over 11,000 trees, principally of Eucalyptus and Acacia varieties, have already been set out and are doing well. In the nursery which has been started in connection with the planting, a large number of trees are ready to be set out as soon as the weather is favorable.

NEW EXPERIMENT GARDEN, MAKIKI.

The new garden will fill a long felt want and will, there is little doubt, be of much value to the Division of Forestry and to the public in general. The large assortment of seed of new and rare plants which we are receiving through our exchange system, after being propagated at the Nursery will be cultivated and cared for in this garden. In time those species which prove to be of value for fruit, forest or ornamental purposes will be increased by seed or cuttings and given out to people who take an interest in such things and who guarantee to take good care of them.

Work was commenced on this garden on April 1, 1908, when two men were employed. The first work done was the making of a wagon road from the bend where the new branch of the Tantalus road connects with the Valley road. This so-called Valley road was in such bad shape, owing to the heavy rains carrying away the unpacked soil on top of the water pipe lately laid to carry the water from the dam at the top of the valley, that it was difficult and even dangerous for people to get over it on foot. Considerable work was put on the road with the result that we have managed to make a fairly good wagon road so that the plants raised at the Nursery can be transferred.

The piece of land upon which the garden is started contains about three acres. A wire fence has been built around three sides of the garden, the fourth or south side being bounded by steep rocks, which makes it proof against stray animals. A portion of the land has been trenched over to a depth of two feet. A few benches have been made to hold plants in pots, also a tool shed and another shed built for the men to work in on rainy days. A good water supply has been secured independent of the city supply. A small dam was built in the stream, which is kept fed by the rains at the top of the valley—also seepage from the water works dam. Only once during the long dry spell did the stream run dry. A one and a half inch pipe was laid along the center of the lot and three-quarter inch pipes connected with it. Over one-half of the garden is already connected with the water pipe. The soil is good and a beginning will be made soon to plant some of the valuable species we have on hand.

NUUANU FOREST.

The condition of the forest in the upper part of Nuuanu Valley is very good. The trees planted a number of years ago are doing exceedingly well and especially so on the part that was planted last. This part being farther from the Pali and not so much exposed to the heavy winds which sweep over the land near the Pali, is the reason for the much better growth of the trees. As far as possible the planted trees, as well as the indigenous trees are being kept clear of vines. The vine called "Maile pilau" is the worst, although the Convolvulus is detrimental to the growth of the trees in some parts and requires to be cut away. The work of clearing away the vines ought to be continued; also the guarding of the forest against trespass by mischievous people and stray animals. This work has been attended to during the period by the men employed, in addition to the work of clearing away vines, etc.

TANTALUS FOREST.

Although the lower part of the forest suffered considerably during the long dry spell—which is responsible for the dead trees to be seen near the lower edge of the forest—the health of the trees in general is good. Trails running through the forest have been kept clear by the Ranger. This is necessary and especially so during the dry season, as a protection against fires. No fires, however, have been reported in this forest during the year.

The forest is sadly in need of a careful thinning and clearing out of the dead or dying Lantana. The danger from fires is much greater since the Lantana started to die out than when it was green and healthy. Consequently a great deal of care ought to be taken by the people passing through the forest during the dry season. The throwing away of stumps of a cigar or cigarette might result in destroying thousands of dollars worth of property. Many of the trees in this forest are approaching maturity and will, there is no doubt, be valuable for various purposes.

Respectfully submitted,

DAVID HAUGHS,
Forest Nurseryman.

LIST OF DISTRICT FORESTERS.

(Corrected to December 31, 1908.)

Following is a list of the (thirty-nine) District Foresters with their respective jurisdictions. Those marked with a star (*) were appointed Special Territorial Police Officers to enforce the Terms of the Wild Bird Law, Act 104 of the Session Laws of 1907:

KAUAI.

*** ALBERT S. WILCOX.**

In and for the District of Halelea.

J. R. MYERS.

In and for the District of Koolau, excepting the land of Anahola.

*** GEORGE H. FAIRCHILD.**

In and for the land of Anahola and the northern portion of the District of Puna, extending as far as the land of Wailua.

*** F. WEBER.**

In and for the portion of the District of Puna, south of and including the land of Wailua, except the lands controlled by Grove Farm Plantation.

*** EDWARD BROADBENT.**

In and for those lands in the District of Puna, controlled by the Grove Farm Plantation.

REV. J. M. LYDGATE and * WALTER D. McBRYDE.

In and for that portion of the District of Kona, lying to the east of the Hanapepe Valley.

*** FRANCIS GAY.**

In and for that portion of the District of Kona, lying between and including the Waimea, Poomau and Kauaikanana Valleys on the west and the Hanapepe Valley on the east.

*** AUGUSTUS F. KNUDSEN.**

In and for the District of Na Pali and that portion of the District of Kona, formerly known as the District of Waimea, lying to the west of the Waimea, Poomau and Kauaikanana Valleys.

OAHU.

*** ANDREW ADAMS.**

In and for the District of Koolauloa.

*** L. L. McCANDLESS.**

In and for that portion of the District of Koolaupoko extending from Koolauloa to the land of Heeia.

*** W. C. WEEDON.**

In and for that portion of the District of Koolaupoko extending from and including the land of Heeia to the land of Kailua.

*** JOHN HERD.**

In and for that portion of the District of Koolaupoko extending from and including the land of Kailua to Makapuu Point.

*** PAUL R. ISENBERG.**

In and for that portion of the District of Kona extending from Makapuu Point to and including Manoa Valley.

*** WALTER F. DILLINGHAM.**

In and for the Districts of Ewa and Waianae.

W. W. GOODALE.

In and for the District of Waialua.

MOLOKAI.

*** JAMES MUNRO.**

In and for that portion of the Island of Molokai lying to the west of Wailau Valley and the land of Mapulehu.

*** C. C. CONRADT.**

In and for that portion of the Island of Molokai, including and lying to the east of Wailau Valley and the land of Mapulehu.

LANAI.

*** CHARLES GAY.**

In and for the Island of Lanai.

MAUI.

H. P. BALDWIN.

District Forester at Large for the Island of Maui.

*** L. BARKHAUSEN.**

In and for the District of Lahaina.

H. B. PENHALLOW.

In and for the District of Wailuku.

*** H. A. BALDWIN.**

In and for the District of Hamakuapoko and the western half of the District of Hamakualoa.

*** W. F. POGUE.**

In and for the District of Koolau and the eastern half of the District of Hamakualoa.

*** C. J. AUSTIN.**

In and for the District of Hana.

*** L. VON TEMPSKY.**

In and for the District of Makawao.

L. VON TEMPSKY and DR. J. H. RAYMOND.

In and for the Districts of Kula, Honuaula, and the lands beyond to and including Kaupo.

HAWAII.

*** G. C. WATT.**

In and for the District of North Kohala, and that portion of the District of Hamakua lying between the District of North Kohala and the Waimanu Valley.

*** A. W. CARTER.**

In and for the District of South Kohala.

*** A. AHRENS.**

In and for that portion of the District of Hamakua from and including the Waimanu Valley to the District of Hilo.

*** JOHN M. ROSS.**

In and for that portion of the District of Hilo extending from the District of Hamakua to the land of Makahanaloa.

*** JOHN A. SCOTT.**

In and for that portion of the District of Hilo extending from the District of Puna to and including the land of Kikala.

*** JOHN WATT.**

In and for the District of Puna.

*** JULIAN MONSARRAT.**

In and for that portion of the District of Kau extending from the District of Puna to and including the land Punaluu.

*** GEORGE C. HEWITT.**

In and for that portion of the District of Kau extending from the land of Punaluu to the District of Kona.

*** R. VON S. DOMKOWITZ.**

In and for that portion of the District of South Kona extending from the District of Kau to the land of Kaohe.

W. R. CASTLE.

In and for that portion of the District of South Kona extending from and including the land of Kaohe to the District of North Kona.

*** JOHN D. PARIS.**

In and for that portion of the District of North Kona extending from the District of South Kona to and including the land of Kahaluu.

*** JOHN A. MAGUIRE.**

In and for that portion of the District of North Kona extending from Kahaluu to the District of South Kohala.

LIST OF DISTRICT FIRE WARDENS.

(Corrected to December 31, 1908.)

Following is a list of (forty-nine) District Fire Wardens, with their respective Districts:

CHIEF FIRE WARDEN.

RALPH S. HOSMER.

Superintendent of Forestry, *ex officio*.

DEPUTY FIRE WARDEN AT LARGE.

DAVID HAUGHS.

In and for the Territory of Hawaii.

DISTRICT FIRE WARDENS.

KAUAI.

C. W. HUDSON.

In and for the Wainiha Valley, District of Halelea.

W. F. SANBORN.

In and for the District of Halelea, excepting the Wainiha Valley.

J. R. MYERS.

In and for the District of Koolau, excepting the land of Anahola.

GEORGE H. FAIRCHILD.

In and for the portion of the Districts of Koolau and Puna, extending from the land of Anahola to the land of Olohena, inclusive.

F. WEBER.

In and for the portion of the District of Puna, south of and including the land of Wailua.

REV. J. M. LYDGATE.

In and for that portion of the District of Kona, formerly known as the District of Koloa.

FRANCIS GAY.

In and for that portion of the District of Kona, lying between and including the Waimea, Poomau and Kauaikanana Valleys on the west and the Hanapepe Valley on the east.

AUGUSTUS F. KNUDSEN.

In and for the District of Na Pali and that portion of the District of Kona, formerly known as the District of Waimea, lying to the west of the Waimea, Poomau and Kauaikanana Valleys.

OAHU.

ANDREW ADAMS.

In and for the District of Koolauloa.

FRANK PAHIA.

In and for that portion of the District of Koolaupoko, extending from the Koolauloa District line to the land of Heeia.

GEORGE CAMPBELL.

In and for that portion of the District of Koolaupoko, extending from and including the land of Heeia to the land of Kailua.

JOHN HERD.

In and for that portion of the District of Koolaupoko, extending from and including the land of Kailua to Makapuu Point.

CHARLES H. BAILEY.

In and for that portion of the District of Kona, extending from Makapuu Point to Palolo Valley.

H. J. RHODES.

In and for Palolo Valley, District of Kona.

W. M. GIFFARD.

In and for that portion of the District of Kona, lying between Puaoa and Manoa Valleys.

G. H. MOORE.

In and for Pauoa and Nuuanu Valleys, District of Kona.

WALTER F. DILLINGHAM.

In and for the District of Ewa and that portion of the District of Waianae lying to the East of the Waianae Mountains.

F. MEYER.

In and for that portion of the District of Waianae lying to the West of the Waianae Mountains.

* W. M. TEMPLETON.

In and for the District of Waialua.

MOLOKAI.

JAMES MUNRO.

In and for that portion of the Island of Molokai lying to the West of Wailau Valley and the land of Mapulehu.

C. C. CONRADT.

In and for that portion of the Island of Molokai including anl lying to the East of Wailau Valley and the land of Mapulehu.

LANAI.

CHARLES GAY.

In and for the Island of Lanai.

MAUI.

H. P. BALDWIN.

Fire Warden at Large, for the Island of Maui.

LOUIS BARKHAUSEN.

In and for the District of Lahaina.

R. C. SEARLE.

In and for the District of Kaanapali.

H. B. PENHALLOW.

In and for the District of Wailuku.

H. A. BALDWIN.

In and for the District of Hamakuapoko and the west half of the District of Hamakualoa.

W. F. POGUE.

In and for the District of Koolau and the east half of the District of Hamakualoa.

JOHN CHALMERS.

In and for the District of Hana.

....

In and for the District of Kipahulu.

J. H. RAYMOND, M. D.

In and for the Districts of Honuaula and Kahikinui.

L. VON TEMPSKY.

In and for the Districts of Kula and Kaupo.

HAWAII.

G. C. WATT.

In and for that portion of the north half of the District of Kohala, extending from the land of Kaauhuhu to the Hamakua District line.

SAM P. WOODS.

In and for that portion of North Kohala, extending from the northern boundary of the land of Kawaihae I to and including the land of Kaauhuhu.

SAM M. SPENCER.

In and for the District of South Kohala.

AUGUST AHRENS.

In and for the western part of the District of Hamakua, extending to the boundary of the land of Paauhau.

JAMES GIBB.

In and for that portion of the District of Hamakua, extending from the western boundary of the land of Paauhau to the boundary of the land of Kukaiau.

ALBERT HORNER.

In and for that portion of the District of Hamakua, extending from and including the land of Kukaiau to the Hilo District line.

JOHN M. ROSS.

In and for that portion of the District of Hilo, extending from the Hamakua District line to the land of Makahanaloa.

JOHN T. MOIR.

In and for that portion of the District of Hilo, extending from and including the land of Makahanaloa to the land of Kikala.

JOHN A SCOTT.

In and for that portion of the District of Hilo, extending from the Puna District line to and including the land of Kikala.

JOHN WATT.

In and for the District of Puna.

WILLIAM G. OGG.

In and for that portion of the District of Kau, extending from the Puna District line to and including the land of Punaluu.

CARL WALTERS.

In and for that portion of the District of Kau, extending from the land of Punaluu to the Kona District line.

R. VON S. DOMKOWITZ.

In and for that portion of the District of Kona, extending from the Kau District line to and including the land of Kaapuna.

T. C. WHITE, *Acting*.

In and for that portion of the District of Kona, extending from the land of Kaapuna to and including the land of Hookena.

JOHN D. PARIS.

In and for that portion of the District of Kona, extending from the land of Hookena to and including the land of Kaawaloa.

T. C. WHITE.

In and for that portion of the District of Kona, extending from the land of Kaawaloa to and including the land of Kahaluu.

JOHN A. MAGUIRE.

In and for that portion of the District of Kona, extending from the land of Kahaluu to the Kohala District line.

FOREST RANGER.

DAVID KAPIHE.

In and for that section of the District of Kona, Island of Oahu, bounded on the east by Manoa Valley, on the north by the Konahuanui Mountain Range, on the west by Nuuanu and Pauoa Valleys, and on the south by the makai edge of the Eucalyptus forest, the Makiki reservoir and the mauka boundary of the Judd land in Makiki and Manoa.

Preliminary Report of the Territorial Conservation Commission of Hawaii.

Honolulu, Hawaii, Nov. 14th, 1908.

Honorable W. F. Frear,
Governor of Hawaii,
Honolulu, Hawaii.

Sir:—The Territorial Conservation Commission of Hawaii has the honor to submit herewith a preliminary report on the nature and present condition of the natural resources of the Territory, together with certain recommendations looking to their proper development and wise use.

The duty of the Commission is to inquire into the natural resources of the Territory, to bring together the available information in regard to their present condition, and in coöperation with the National Conservation Commission and the Conservation Commissions of other states and territories to assist in formulating plans whereby the material resources of the Nation as a whole and of this Territory in particular may be wisely and conservatively used "in such a way as to promote the greatest good of the greatest number for the longest time."

The whole economic fabric of the Territory of Hawaii is closely bound up with the right use of its natural resources. Although politically an integral part of the Union, in situation Hawaii is remote from the other states and territories. Notwithstanding this fact even a casual inspection of the local problems of conservation shows that the majority of them are shared in common by Hawaii and by mainland states. The possibility of any extensive development of the resources of Hawaii depends on the continued prosperity of the mainland. The prosperity of the mainland rests in turn on the wise use of the sources of national wealth. Consequently both because of its own local problems and because of the relation that the wise use of the resources of the mainland bears to the question, Hawaii takes a real and vital interest in Conservation and in all that pertains thereto.

The natural resources of Hawaii are waters, soils and forests. Minerals can at present hardly be said to claim a place in the list, although recent developments in the making of lime from coral sand are an indication that as the result of a comprehensive investigation cement making and perhaps other industries dependent on mineral wealth could also be developed. Incidentally it may be remarked here that certain red earths, not uncommon in the Territory, have long been used locally in the preparation of paints.

Hawaii is essentially a country dependent on agriculture. From its geographic position, its sub-tropical climate, and the peculiarities of its topography, irrigation plays a large and increasingly important part in the economic development of the Territory. The main industry is the production of sugar cane. Of the fifty odd sugar plantations over half are irrigated. On the non-irrigated plantations much water is needed for fluming cane to the mill or for power development. Other important industries are the growing and canning of pineapples, the production of rice, coffee, sisal and bananas, and cattle grazing. Rubber and tobacco give promise of good returns if rightly handled.

Waters.—For the successful development of all these industries water is needed in larger or smaller quantities. In many cases this necessitates a supply artifically procured. There have already been built, wholly by private enterprise and at private expense amounting to over $15,000,000, elaborate irrigation systems to supply water for the irrigation of the sugar plantations. But as yet only a part of the water that could be turned to account is utilized. In the harnessing of the streams to produce power much also remains to be done.

Naturally the first step in a more complete and rational utilization of this great source and producer of wealth is an accurate and exhaustive examination of the water resources of the Territory. In the judgment of this Commission the need for such a survey by competent water experts is the most pressing necessity in the way of Conservation work, for on the possibility of bringing more water onto the land depends the whole future development of the Territory.

There are no navigable streams in the Territory of Hawaii. The value of water centers in its use for irrigation and power development.

Forests.—The primary value of the forests of Hawaii is that they serve as a protective cover on the steep, short water sheds of the streams needed for irrigation. This use was early recognized and has led to the setting apart of forest reserves—at first by private owners and later, during the last five years, under the direction of the Territorial Government. At the present time the total area of existing forest reserves is 444,116 acres, or about one-tenth of the total area of the Territory. Later it is expected considerably to increase the area so set apart.

In certain of the leeward districts, where the question of stream protection does not enter, the Hawaiian forest has commercial value, and is being systematically exploited. The principal products are Ohia Lehua railroad ties and Koa lumber—in the trade called Hawaiian Mahogany—a fine grained, rich-colored hardwood, of value for interior finish and cabinet work.

The forest work of the Territory is carried on by technically trained men, Hawaii being one of the eleven States of the Union to employ a professional forester.

Lands.—Outside of the lands now under cultivation and those that should be kept permanently under forest there are considerable areas that with the application of water could unquestionably be made of high productive value. This class of land is now used principally for cattle grazing. In the aggregate it includes many thousand acres. It would appear that much of it is susceptible of reclamation for some more intensive form of agriculture. Here again the present need is for a thorough and careful study by experts. It should first be ascertained how much of this class of land can be brought under irrigation and second for what purposes it is best adapted if an adequate water supply were once assured. This indicates that along with a hydrographic survey there should also be a soil survey and a systematic classification of the land according to the uses to which it is best adapted. Such investigations pave the way for the incoming of the man who can successfully establish a home and build up a self-sustaining industry.

In addition to the lands that can be reclaimed through irrigation there are in Hawaii large tracts of waste land, such for example as areas covered by comparatively recent lava flows. Much of this class of land must always remain as waste land but portions of it are probably susceptible of being turned to useful account. A systematic classification of all lands would be a long step in this direction.

ORGANIZATION AND WORK OF THE COMMISSION.

The Territorial Conservation Commission of Hawaii was appointed by Governor Frear on July 23rd, 1908. Upon the organiation of the Commission at a meeting held on July 31st, 1908, it was decided to take up the investigation through committees, as follows:

Forests: Messrs. Hosmer and Gartley.
Waters: Messrs. Gartley and W. O. Smith.
Lands and Soils: Messrs. J. G. Smith and Dillingham.

The several committees at once set about getting statistics and other information. Some of these data are submitted herewith in the form of appendices. Other data are not as yet in shape to be given out but will form the subject of a later report. The statements made in the appendices, while accurate as far as they go are therefore to be considered as preliminary only and subject to amplification.

It is perhaps not surprising that it has taken longer to collect accurate information concerning the natural resources of the Territory and their present condition than was at first anticipated. Many of the figures essential to such a compilation were found not to be available or only obtainable after extended inquiry. This condition has brought home to the Commission the extreme desirability of having in Hawaii some Territorial official charged with the duty of compiling statistics. In almost all the lines of inquiry before the Commission it should be possible to get facts and figures but as it is now the desired data are only to be had from individuals and corporations. There is no impropriety in the making public of the greater part of these data, nor are the corporations who have them unwilling to let them be so used. If there were a Territorial Statistician to attend to the collection of these and similar data valuable information on many subjects which it now takes weeks of labor to obtain would be available for instant reference.

RECOMMENDATIONS.

As a result of the study that has so far been made the Territorial Conservation Commission of Hawaii is unanimously of the opinion that for the best interests of the Territory there is urgent need of action looking to the conservation and more systematic use of the natural resources of the Territory.

To this end the Commission makes the following recommendations:

First. That active steps be taken to secure from the Territorial Legislature at its coming session an appropriation of not less than $5,000 per year for a topographic and hydrographic survey of the Territory of Hawaii, to be made by the U. S. Geological Survey.

Following the usage customary in such coöperative agreements, the appropriation should be made contingent on the expenditure of an equal sum by the Federal Government. Such a survey would serve as a basis for a later and more extended study of the problems of reclaiming the many thousand acres of potentially agricultural land that require irrigation for successful development.

It is further recommended that this project be brought to the attention of the proper departmental authorities in Washington in such a way as to attract their interest and support.

Second. That there should be undertaken under the auspices of the Territorial Government a careful and thorough classification of the public lands of the Territory, with especial reference to the adaptability of those not now under cultivation for use in the development of diversified industries.

Third. That further to make available accurate information of assistance to prospective settlers and others appropriate action be taken to secure the extension to Hawaii of the soil survey conducted by the Bureau of Soils of the United States Department of Agriculture.

Fourth. That in view of the fact that the successful development of diversified industries in Hawaii depends in large measure on making the agricultural lands accessible, the importance of goods roads and other means of inland transportation be emphasized.

In Hawaii there are no internal waterways to assist in transportation. Consequently it is the more necessary that adequate appropriations be made by the Territorial and local authorities for the building and up-keep of the principal and secondary roads.

Fifth. That an appropriation be secured at the coming session of the Legislature for a Territorial Statistician.

Such an official should properly be attached to one of the existing departments. The salary should be sufficient to secure the services of a capable person and provision should be made for a certain amount of clerical assistance.

Sixth. That a systematic attempt be made to develop and more firmly establish diversified industries in the Territory.

To this end the Hawaii Experiment Station should receive not only the moral but the financial support of the Territory, in order that it may enlarge the scope of its work, particularly in the way of establishing local demonstration areas.

Very respectfully,

Ralph S. Hosmer,
William O. Smith,
A. Gartley,
W. F. Dillingham,
Jared G. Smith,
Territorial Conservation Commission of Hawaii.

Appendix "A."

REPORT OF THE COMMITTEE ON FORESTS.

Honolulu, Hawaii, Nov. 14th, 1908.

For a clear undertaking of the forest situation in Hawaii it is necessary that one be acquainted with the conditions of topography and local climate. Lying in the belt of the northeast trade winds and being mountainous it follows that the Hawaiian Islands have a climate characterized by contrasts. On the windward slopes of the mountains is an area of high precipitation; in the leeward districts scant rainfall, even approaching aridity, is the rule. These facts coupled with the remarkable porosity of the soil, due to its volcanic origin, have a very direct bearing on the forest situation.

There are two main classes of forest in Hawaii. Both are of economic value; one because it helps to conserve the water needed for irrigation, power development and domestic supply, the other because it produces wood and timber. The forests of the former class are as a rule situated on the moist, windward slopes of the higher mountains. They are essentially "protection forests" in that their main value rests in the water that can be got from them. Those of the latter class, the commercial forests, are found in the districts where because of the absence of running streams watershed protection does not figure. The forests of the first class are by long odds the most important, for in Hawaii the relation between sustained stream flow and a watershed protected by a forest cover is intimate and peculiarly direct.

Hawaii is a country essentially dependent on agriculture. The main crop is sugar cane. On more than half of the 54 plantations irrigation is essential for successful cultivation, for although the soil in the leeward districts is rich it requires water to be made commercially productive. Water is also needed on the non-irrigated plantations for the development of power and the fluming of cane. The important part that irrigation plays in Hawaii may perhaps be made more apparent by the statement that over fifteen million dollars has been expended, wholly by private enterprise, in developing the irrigation systems that supply water to the cane fields of the irrigated plantations.

The importance of the forest is generally recognized in Hawaii and has led to a strong public sentiment in favor of forestry. This finds expression in a Territorial Forest Service charged with the creation and administration of forest reserves and with the prosecution of other forest work. During the past five years under a definite forest policy systematically followed sixteen forest reserves have been set apart, with an aggregate total area of 444,116 acres. Of this area 273,912 acres, or 61 per cent., is land belonging to the Territorial Government. The other 39 per cent. is in private ownership but for the most part the owners of the lands, fully aware of the benefits of forest protection, coöperate actively with the Territorial Government in the management of the forest reserves.

There are three main types of forest in Hawaii, the Koa and Ohia forest lying between the elevations of two and six thousand feet; the Mamani forest, a pure stand of another native Hawaiian tree found on the upper slopes of the higher mountains; and the introduced Algaroba forest, which occurs at the lower levels on the leeward side of each of the larger islands.

The typical Hawaiian forest is of the first type. The forest consists of a dense jungle of trees, high growing shrubs, tree-ferns and climbers, with much undergrowth and a heavy ground cover of ferns and bracken. Altogether it is a plant community admirably adapted for the conservation of moisture, for preventing erosion and for serving as a reservoir to feed the springs and streams that rise within its bounds. The most important trees are Ohia Lehua (*Metrosideros polymorpha*) and Koa (*Acacia koa*).

The forest in all the forest reserves is of this type. A recent compilation of the forest areas of the Territory shows that the Koa and Ohia forest covers approximately 1,175,000 acres. Of this area it is estimated that eventually about three-quarters of a million acres will be included within forest reserve boundaries, of which about 70 per cent. will be Government land.

Above the level of the Koa and Ohia forest, on the slope of Mauna Kea (elevation 13,825 feet), on the Island of Hawaii, is found a nearly pure stand of another native Hawaiian tree, Mamani (*Sophora chrysophylla*). This forest occurs in a belt lying between the elevations of 6,000 and 8,500 feet. The area of the Mamani forest on Mauna Kea is 63,500 acres. Mamani occurs elsewhere in the Territory but does not at the present time form what may be called forests. It is, however, spreading rapidly so that in future years it will play a much larger part than it does now.

Mamani makes excellent fence posts, for which purpose the trees in the upper forest belt are cut for local use. No accurate figures as to the number cut are now available. Otherwise this type of forest is unimportant commercially.

The Algaroba (*Prosopis juliflora*) is the Mesquite of the Southwest. This tree was introduced into the islands in 1837. It has now spread so as to cover between fifty thousand and sixty thousand acres below an elevation of 1,000 feet in the leeward districts of the larger islands of the group. It is spreading rapidly along the leeward coasts and is also gradually climbing to a higher elevation.

The Algaroba forest is the largest single source of fuel supply in the Territory. It is estimated that over 3,000 cords are sold annually in Honolulu. The price varies from $12 to $14 a cord, delivered.

The Algaroba forests are further of value because the pods make good stock feed and also because the tree is one of the important plants locally for bee food. It is estimated that for the calendar year 1907, the total amount invested in apiaries and other equipment for the manufacture of Algaroba honey was $125,000 and that the gross receipts for Algaroba honey products for the year were over $25,000.

It has already been shown that the primary value of the Hawaiian forest rests in the influence it exerts on the conservation of water and that the commercial aspect relatively takes second place. But in the leeward districts on the Island of Hawaii are considerable areas where owing to the great porosity of the soil there are no permanently running streams. Here the main value of the forest rests in the wood and timber that it can be made to produce. The two Hawaiian woods of commercial importance are Koa and Ohia Lehua. Both are heavy, close-grained hardwoods. Koa is used for interior finish, furniture, cabinet work and veneering. It is now sold in the markets of the American mainland under the name "Hawaiian Mahogany." Ohia is valuable for railroad ties. The systematic lumbering of this class of Hawaiian forest began in October, 1907, when a contract for ninety million board feet of Ohia railroad tie material was made between a local company and the Santa Fé Railway.

A tie mill with a daily capacity of 2,500 ties has recently been erected. The first regular shipment of ties is about to be made. No accurate estimates either of the amount of timber or the exact area covered by forests of the commercial class have yet been made, but the area is sufficient and the stand heavy enough to justify the continuation of lumbering operations for a considerable time.

The fact that none of the native trees in Hawaii furnish construction timber has led to extensive tree planting, both by the Territorial Government and by private interests. This work has been going on for the last thirty years and is constantly increasing in extent and importance. The trees principally planted are several kinds of Eucalyptus, the Australian Ironwood and Silk Oak and the Japanese Cedar. Wood and timber cut from the planted forests in Hawaii is now being used for fence posts, railroad ties, bridge timbers and wagon work. Practically all the construction timber used in Hawaii is imported from Puget Sound and Northern California, mainly Redwood and Northwest (Douglas Fir).

In the reports of the U. S. Department of Commerce and Labor it is stated that for the fiscal year ending June 30th, 1907, there was imported into Hawaii from the mainland thirty million six hundred and three thousand feet, board measure, of timber boards and planks, valued at $565,425.00. For the same year 17,476,000 shingles, valued at $39,207.00 and other unmanufactured lumber to the value of $116,756 were also imported, making in all a total of $721,388.00 for unmanufactured wood products. The value of manufactured wood products imported during the same fiscal year was $214,648.00. Further comment on the desirability of doing even a little towards securing a local source of supply is unnecessary.

It may perhaps be pertinent in closing this statement to note that a forest fire law similar to that of California was enacted by the Territorial Legislature at the Session of 1905. The Territorial Superintendent of Forestry is *ex officio* Chief Fire Warden and provision is made for a corps of District Fire Wardens to be paid for duty actually performed.

As a matter of fact plantation managers and other influential citizens agreed to take these positions without remuneration. The law provides penalties in case of damage resulting from the careless or malicious use of fire. Since its enactment there have been few fires of consequence, due in part to a better public sentiment created by the presence of the law on the statute books and to the interest aroused in the matter at the time of the enactment of the law.

Following is a table showing the names, locations, dates of proclamation and areas of the 16 forest reserves so far established in the Territory of Hawaii.

RALPH S. HOSMER,

A. GARTLEY,

Committee on Forests.

FOREST RESERVES, TERRITORY OF HAWAII.

Arranged in Chronological Order.

(Corrected to October 31, 1908.)

No.	Name.	District.	Island.	Total Area Recommended to be Reserved.	Area Government Land.	Area Private Land.	Date of Proclamation.	Proclamation Signed by.
				Acres.	Acres.	Acres.		
1	Kaipapau	Koolauloa	Oahu	913	913	......	Nov. 10, 1904	G. R. Carter
2	Hamakua Pali	Hamakua	Hawaii	18,940	16,333	2,607	Dec. 23, 1904	"
3	Hilo	Hilo	Hawaii	110,000	60,223	49,777	July 24, 1905	A. L. C. Atkinson
4	Koolau, Maui	Koolau and Hamakualoa	Maui	42,969	30,230	12,739	Aug. 24, 1905	"
5	Halelea	Halelea	Kauai	37,500	10,990	26,510	Aug. 24, 1905	"
6	Kealia	Puna	Kauai	9,935	7,385	2,550	Mar. 9, 1906	"
7	Ewa	Ewa, Waianae and Waialua	Oahu	28,550	5,151	23,399	Mar. 9, 1906	"
8	Honuaula	Kona	Hawaii	665	665	......	April 4, 1906	"
9	Kau	Kau	Hawaii	65,850	59,618	6,232	Aug. 2, 1906	G. R. Carter
10	Waianaekai	Waianae	Oahu	3,257	3,150	107	Sept. 7, 1906	"
11	Lualualei	Waianae	Oahu	3,743	3,743	......	Nov. 30, 1906	"
12	Hana	Hana	Maui	14,825	13,767	1,058	Nov. 30, 1906	"
13.	Na Pali-Kona	Na Pali and Kona	Kauai	60,540	40,650	19,890	June 12, 1907	A. L. C. Atkinson
14	West Maui	Lahaina, Kaanapali and Wailuku	Maui	44,440	19,105	25,335	April 21, 1908	W. F. Frear
15	Makawao	Hamakuapoko	Maui	1,796	1,796	......	April 21, 1908	"
16	Waiaha Spring	Kona	Hawaii	193	193	......	April 21, 1908	"
	Grand Total on October 31, 1908			444,116	273,912	170,204		

Appendix "B."

REPORT OF THE COMMITTEE ON WATERS.

Present and Prospective Use of Water for the Development of Power in the Hawaiian Islands.

Honolulu, Hawaii, Nov. 14th, 1908.

In considering the conservation of the resources of this Territory the possibility of the development and utilization of water power should be given very serious consideration.

At the present time a few developments have been made which are of considerable economic value and there are great possibilities for future development. At the present time practically all the water power is in use generating electric power to supply motive power for irrigating pumps, the most important one being the Kauai Electric Company on the Island of Kauai, where two twelve hundred kilowatt generators are installed in Wainiha Valley, utilizing some forty million gallons per day at a head of 575 feet. Power is transmitted 35 miles to the McBryde Sugar Company's plantation and there utilized in operating six multiple-stage centrifugal pumps direct connected to motors of an aggregate horsepower of 4,000. These pumps have a capacity of 31,000,000 gallons at a head of 175 to 400 feet, thus serving to irrigate over 3,000 acres of cane.

At Kekaha, Kauai, water is taken from a high level irrigating ditch and dropped 275 feet to irrigate the low level lands. At this point a six hundred kilowatt generator is installed to furnish power for four motors direct connected to multiple-stage centrifugal pumps having an aggregate horsepower of 700, the pumps having a capacity of 7,000,000 gallons at a head of 300 feet. The water for these pumps is taken from an irrigating ditch and pumped to a level above the ditch, thus rendering 700 acres of good cane land available.

The Pioneer Mill Company, at Lahaina, Maui, has installed a 250 kilowatt generator operated by water power which furnishes current for 200 horsepower motor operating a triplex reciprocating pump, which delivers 9,000,000 gallons of water against a head of 100 feet.

The Oahu Sugar Company, on the Island of Oahu, takes water from an irrigating pipe line and develops 120 kilowatts, which supplies a 100 horsepower motor direct connected to a centrifugal pump.

The Makee Sugar Company, at Kealia, Kauai, has installed and in operation a 300 kilowatt generator supplying current to a 225 horsepower motor operating a reciprocating pump having a capacity of 2,800,000 gallons of water against a head of 250 feet.

The Waianae Sugar Company, on the Island of Oahu, has installed two 200 kilowatt generators supplying current to motors of 375 horsepower to pump six and a half million gallons of water against a head of 150 to 280 feet.

The Hilo Electric Light Company, on the Island of Hawaii, develops 750 horsepower to operate generator of an aggregate capacity of 450 kilowatts to supply light and power for the City of Hilo.

The Territory of Hawaii has installed and in operation in Nuuanu Valley, Island of Oahu, water power driven generators of 400 kilowatts capacity for supplying arc lights and Territorial Government lighting in the City of Honolulu.

There are several small water power developments in mills varying from 10 to 50 horsepower which are used for operating machinery or electric generators.

The aggregate horsepower of these developments is approximately 6,500 horsepower.

It is impossible to make an estimate of the prospective power development and at best only a few can be mentioned. These are such powers as have been rendered available through partial developments made for irrigating purposes or where the possibilities are self evident. The conservation and development of water at high levels for irrigating purposes will render many other plants both possible and expedient. A close approximation of the ultimate possibilities can only be made when complete surveys of the watersheds, records of the rainfall and the cost and economic value of the developments are obtained.

The Island of Kauai presents a fertile field for future development and there are at the present time some 2,000 horsepower additional at Wainiha which is not being utilized; possibly 4,000 horsepower at Hanalei, and 1500 or 1800 horsepower at Makaweli, 500 or 600 horsepower at Hanapepe, and by the development of reservoirs back of Waimea, Wahiawa, Koloa, Wailua, Kapaa, Anahola and Kalihiwai several hundred horsepower can be made available.

On the Island of Oahu possibly 2,000 horsepower can be developed at Wahiawa and from the new high level reservoir in Nuuanu Valley.

On Maui the Hawaiian Commercial & Sugar Company at Kanai and in Iao Valley can develop about 2,500 horsepower; and there are several hundred horsepower available at Waihee in the development of the Wailuku Sugar Company. Some 1,200 horsepower could be rendered available at Lahaina from the development of the Pioneer Mill Company.

The power resources of the Island of Molokai are practically undertermined.

On the Island of Hawaii it is estimated that in the Waipio Gulch some 8,000 horsepower can be rendered available by the present irrigating ditch development and on the north coast from Waipio to Hilo there are large quantities of water going to waste or in use for fluming cane which could be developed. No estimate of the amount of this power is available, but it would amount to several hundred horsepower.

Storage capacity constructed in the Kohala Mountains would render power available, but at present the quantity is entirely undetermined.

At many places the permanency of the flowing streams is not assured, but the development of storage capacity would render the power secure and in many cases would increase the estimate of the amount available. However, the broken character of the country where these powers are available and the limited amount of arable land and water available for this land makes the economic value of the development of these powers questionable.

The production of fertilizers from atmospheric nitrogen by the use of electricity may render the water power extremely valuable at such places where the power cannot be used for pumping water for irrigating purposes.

A. Gartley,
W. O. Smith,
Committee.

Appendix "C."

HAWAIIAN SUGAR PLANTATION STATISTICS.

Honolulu, Hawaii, Nov. 14th, 1908.

The enclosed Crop Reports for the year ending September 30th, 1908, show the number of tons of sugar produced on the sugar plantations in the Territory of Hawaii, by plantations and islands, and the names of the various agents and also the tons of sugar produced on each plantation for each of the ten years from September 30th, 1899, to October 1, 1908, inclusive.

The average yield of sugar per ton for all of the plantations was in 1906, 8,945 lbs. per acre, or, in round numbers, 4½ tons; the average of the irrigated plantations was 11,526 lbs., or 5¾ tons; and the average of the unirrigated plantations was 6,140 lbs., or a trifle over 3 tons per acre.

The total area of the land in these islands is 4,127,360 acres.

Of this amount 200,000 acres are under cultivation in sugar, of which about 105,000 acres are irrigated and 95,000 acres are unirrigated.

Of the irrigated plantations about 1,000,000 gallons of water is applied per day to each 100 acres of land. To December, 1906, the cost of the irrigation systems of the several plantations was $14,069,804.88.

A little over $2,000,000 is expended each year for fertilizers. An average of about $4.65 for each ton of sugar produced, and $22.20 per acre for the crop.

It must be borne in mind that from eighteen to thirty months is required to mature a crop of sugar cane, so that the number of acres cultivated for each crop does not represent the total area under cultivation. For the crop of 1906, 96,228.6 acres were cultivated, producing 430,368.2 tons.

The plantation companies are nearly all incorporated, and the shares of stock are held by about 7,000 stockholders.

Note:—As many of the readers of this report have already seen copies of the printed tables issued by the Hawaiian Sugar Planters' Association, it is only necessary here to give the totals by islands, as follows:

10 HAWAIIAN SUGAR CROPS, 1899-1908, FROM SEPTEMBER 30, 1899, TO OCTOBER 1, 1908.

	1899 *Tons	1900 Tons	1901 Tons	1902 Tons	1903 Tons	1904 Tons	1905 Tons	1906 Tons	1907 Tons	1908 Tons
Hawaii	117,239	115,224	134,618	121,295	170,665	122,865	126,405	137,750	143,891	180,159
Maui	54,389	57,347	58,349	56,726	84,776	77,985	100,434	102,960	104,772	122,629
Oahu	45,820	53,625	99,534	107,870	121,066	102,019	123,095	113,750	119,273	137,013
Kauai	65,359	63,348	67,537	69,720	61,484	64,606	76,314	74,753	72,081	81,322
Total	282,807	289,544	360,038	355,611	437,991	367,475	426,248	429,213	440,017	521,123

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* 2000 Pounds to the Ton.

Appendix "D."

PRODUCTION OF LIME ON THE ISLAND OF OAHU.

Honolulu, Hawaii, Nov. 14, 1908.

The Waianae Lime Company has 305 acres of land at Waianae, Oahu, from whence limestone is brought to Honolulu in raw state by cars of the Oahu Railway & Land Company and delivered at kilns situated at Iwilei adjacent to the oil tanks. At Iwilei the plant consists of cooper shop, barrel warehouse, lime warehouse and kiln building. Kilns are two in number, known as Schneider Patent Upright Kilns, are equipped with forced draft and have capacity of two hundred and seventy-five barrels per day. Lime is of high calcium quality and averages 97.20 pure, and is mostly used for fertilizer on sugar plantations.

Hawaii.

[A STATEMENT PREPARED FOR PRESENTATION AT THE CONFERENCE OF THE GOVERNORS HELD AT WASHINGTON, D. C., IN MAY, 1908.]

By Hon. Walter F. Frear, *Governor of Hawaii.*

Even the most far reaching problems may often be illumined and sometimes solved by observation or experiment upon a small scale. The laboratory, by its processes of bringing forces into clear relations, may in a moment disclose principles that centuries of national or world-wide experience have left unsuspected. Little, distant Hawaii, now an integral part of the Union as a full-fledged Territory, has been, even since the beginning of Christian civilization there less than a century ago, a veritable laboratory of industrial as well as sociological experimentation under conditions that have seemed almost artificial in the clearness of the relations of the operative forces. It may be that she can shed light, at least by way of illustration, upon some of the needs, methods, and means involved in the all-important national questions presented to the Conference.

I will present but two points. The first is the marvelous results of the application of science to agriculture. That has been in large measure the making of Hawaii industrially.

That Territory is a group of lofty islands of recent volcanic origin, within the tropics, remote from the world's markets. Practically without mineral resources, she is dependent mainly upon her soils; but, although nearly as large as Connecticut and Rhode Island combined, so much of her area is so high or so precipitous or so recently formed or so dry or otherwise unsuited to marketable crops that only a very small percentage can be classed as arable in its natural condition and in the present state of knowledge. Obviously, if she is to support a large population, science must do what nature has left undone, and accordingly perhaps nowhere else is science now being more resorted to for agricultural purposes, and yet only a beginning has been made.

The limited extent of arable public land in Hawaii—and comparatively speaking now on the mainland—calls for the greatest care in its disposition. Adequate precautions should be taken to insure its disposition in general only to bona fide settlers and in not larger quantities to each than can be put to best use; and until a superior use can be found for the large areas still held as public land for which no such use is known at present, they should in general be retained or disposed of only temporarily by lease or otherwise, until a superior use is discovered for them. Hawaii's experience in earlier liberal disposition of the lands and later discoveries of superior uses emphasizes the need of such precautions.

Until a few years ago attention in Hawaii was directed almost exclusively to the production of cane sugar, which, in spite of various adverse natural conditions, has been brought by the application of science to the highest point of efficiency yet attained anywhere,—so much so indeed, that from her comparatively small acreage of cultivated land Hawaii will produce this year more than $40,000,000 worth of sugar alone, or more than one-sixth of this country's consumption of that product, and her exports and imports, with this product as almost their sole basis directly and indirectly, will considerably exceed those of the entire United States at the time of the adoption of the Constitution.

Hawaii being within the tropics, the question of water is of superlative importance. The rainfall is abundant, ranging from a few inches to several hundred inches a year according to locality, but the more abundant fall is usually distant from the land where it is most needed. The problem is that of its conservation by way of preventing it from escaping immediately to the sea in freshets, and that of transferring it to the arid lands. It has been demonstrated that land which, with an ample supply of water properly applied produces, say, ten tons of sugar to the acre, produces only four-fifths of a ton under a rainfall of 32½ inches a year. Most of the irrigated plantations have less than this amount of rainfall. One hundred and five thousand acres or about one-half of the 213,000 acres devoted to sugar production, only about one-half of which is cropped annually, is practically reclaimed arid land,—entirely through private enterprise. The reclamation of this land has involved an expenditure of about $15,000,000 or more than $140 per acre in initial outlay for the construction of ditch, tunnel, flume and pipe lines, reservoirs, pumping plants, artesian and surface wells and electric plants for the generation of power for pumping plants. A single system for one group of plantations includes about 225 miles of main and lateral ditches, tunnels, etc., costing a million and a half dollars, besides wells, reservoirs and pumping plants. In one instance, electric power is generated by water on the rainy side of the island for the operation of pumps on the opposite or dry side. There are 111 pumps in operation with a capacity of 580,000,000 gallons per 24 hours. Sixty per cent. of the water used on irrigated plantations is pumped. The average lift is 191 feet, with a maximum of 550 feet. One acre requires about 5,000,000 gallons per crop or about

10,000 per day. The expense is great but it is a necessity and it pays. The irrigated lands produce nearly twice as much as the unirrigated. Though constituting only half the total area they produce about two-thirds of the total output of 500,000 tons of sugar.

In view of the foregoing, the preservation and extension of forests are obviously prime necessities. The typical islands consist of a high central mountain with radiating ridges and valleys. From ancient times the islands have been subdivided in apple-pie fashion, the typical main division of land extending from seashore to mountain-top and comprising one or more valleys with their side ridges. Even in ancient times each valley had its own network of small ditches for purposes of irrigation. The water-sheds are short, the slopes, steep; there are few permanent springs; it is the forests that must be relied on to hold the water for the steady supply of the streams. The relation between the forests above and the near-by arable plains or gentle slopes below in respect to water supply is too obvious to be disputed. Before the possibilities and needs of irrigation became apparent, much wasting of the forests by cutting and through destruction by live stock was permitted, with most disastrous results, as it now appears. Accordingly, more than thirty years ago, steps were taken by legislation for the preservation and extension of the forests, but not until five years ago was a comprehensive statute passed creating an effective board of agriculture and forestry with adequate powers. Since then 444,000 acres have been set aside by 16 proclamations of the Governor on the recommendation of the Board as forest reservations, of which 61 per cent. is Government land, and within the next few years this area is expected to be extended to about 750,000 acres, or about 80 per cent. of the total forest area, of which about 70 per cent. will be Government land. Government and private lands are sandwiched in with each other and it is of the greatest importance that the Government and private owners coöperate with each other in this matter. Fortunately the need is so obvious and the methods of procedure have been of so friendly a nature that practically no difficulty has been experienced in obtaining the active coöperation of the private owners in the setting aside and fencing of reservations and the keeping out of live-stock. In addition to this nearly one-fourth of the sugar corporations besides many ranchmen and others, are actively engaged in tree planting. Only a comparatively small percentage of forest area or area available for forest on the mainland is in Government ownership. If forestry is to be carried to the extent desired it is essential that private owners be induced to coöperate with the Government or else that private lands be condemned for forest purposes. The principal means of bringing about coöperation would seem to be education—a means which this conference will largely serve to effect and which is already being effected through many other channels.

It is not alone to the question of irrigation in connection with the sugar industry that science has been called upon to contribute. It has been called upon to contribute equally in almost every phase of that industry—in methods of manufacture and cultivation, fertilization, chemistry, entomology, plant pathology and physiology. More than $2,000,000 is expended annually in the purchase of fertilizers, besides which large quantities not purchased are used. The cost of this item alone averages $4.55 per ton of sugar or $22.20 per acre per crop. The planters maintain an experiment station with a large corps of scientists, covering nearly every department of the industry, at an expense greater than that of any experiment station, public or private, on the mainland, with possibly one or two exceptions.

So much as to one industry by way of illustration of the value of the application of science to agriculture in all its aspects. Through the Federal Experiment Station, the Territorial Board of Agriculture and Forestry, and other mediums a good beginning has been made in the same direction in other industries with most promising results—in the pineapple, rubber, sisal, tobacco, and other industries. A college of agriculture has been established; instruction in agriculture as well as in the mechanic arts is made more and more prominent in the public schools, a beginning having been made in this direction as long ago as 1831 and 1836 when industrial training schools, the first in the United States, were established—which in large measure suggested to General S. C. Armstrong, who was born and brought up in Hawaii, the ideas which he later embodied in Hampton Institute.

The needs and opportunities are such that every effort must and will be made in Hawaii to perfect a science of tropical agriculture and build up a group of tropical agricultural industries to the highest point of efficiency to which they can be brought by the application of scientific methods. What is needed now, outside of transportation and other facilities, through the scientific branches of the Federal Government, is assistance in forestry and in soil, topographic and hydrographic surveys and branch experiment stations—so comparatively new is the field of scientific tropical industry and so unique are the conditions of wide variation in rainfall, temperature and soils within shortest distances in Hawaii.

The second point to which I wish to refer is that of the location of Hawaii at the commercial center or cross-roads of the Pacific—which, the greatest of oceans, between the richest of continents, is fast approaching the fulfillment of the long-ago prophecies of von

Humbolt, Seward and others, to the effect that it would eventually be the theater of the world's greatest commerce. If the inland waterways of the Mainland, especially those of the great Mississippi Valley are to be developed to the extent which seems likely in the near future, and if the Panama Canal is to be completed, as it must be, within a few years, not only is it a corollary that Hawaii must be provided with adequate harbor facilities in order to make these other great works serve most completely their purposes, but obviously one of the most effective methods of conserving the natural resources of the United States is by taking advantage of, through these provisions for adequate transportation facilities, the vast natural resources of other countries and especially those of China which are perhaps, next to those of the United States, the richest in the world and as yet practically untouched. The location of Hawaii, which thus far has proved one of the greatest obstacles to her industrial prosperity, will hereafter be one of her greatest assets, and with the proper development of her harbors through Federal aid she will, small though she is, have the proud honor of playing a part out of all proportion to her size in the conservation of the natural resources of the nation.

The Declaration of the Governors.

At the conclusion of the Conference of the Governors held at the White House in May there was unanimously adopted the following statement, which has come to be known as "The Declaration of the Governors." In a recent address President Roosevelt spoke of it as "a memorable declaration which should hang on the wall of every school, and every citizen who is a voter in the United States in the next generation should know about it."

The Declaration in full is as follows:

"We, the Governors of the states and territories of the United States of America, in conference assembled, do hereby declare the conviction that the great prosperity of our country rests upon the abundant resources of the land chosen by our forefathers for their homes and where they laid the foundation for this great Nation.

"We look upon these resources as a heritage to make use of in establishing and promoting the comfort, prosperity, and happiness of the American people, but not to be wasted, deteriorated, or needlessly destroyed.

"We agree that our country's future is involved in this; that the great natural resources supply the material basis upon which our civilization must continue to depend, and upon which the perpetuity of the Nation itself rests.

"We agree, in the light of facts brought to our knowledge and from information received from sources which we cannot doubt, that this material basis is threatened with exhaustion. Even as each succeeding generation, from the birth of the Nation, has performed its part in promoting the progress and development of the Republic, so do we in this generation recognize it as a high duty to perform our part, and this duty, in large degree, lies in the adoption of measures for the conservation of the natural wealth of the country.

"We declare our firm conviction that this conservation of our natural resources is a subject of transcendent importance, which should engage unremittingly the attention of the Nation, the states, and the people in earnest coöperation. These natural resources include the land on which we live, and which yields our food; the living waters which fertilize the soil, supply power, and form great avenues of commerce; the forests which yield the materials for our homes, prevent erosion of the soil, and conserve the navigation and other uses of our streams; and the minerals which form the basis of our industrial life, and supply us with heat, light and power.

"We agree that the land should be so used that erosion and soil wash should cease, that there should be reclamation of arid and semi-arid regions by means of irrigation; that the waters should be so conserved and used as to promote navigation, to enable the arid regions to be reclaimed by irrigation, and to develop power in the interests of the people; that the forests, which regulate our rivers, support our industries, and promote the fertility and productiveness of the soil, should be preserved and perpetuated; that the minerals found so abundantly beneath the surface should be so used as to prolong their utility; that the beauty, healthfulness, and habitability of our country should be preserved and increased; that the sources of national wealth exist for the benefit of the people, and that the monopoly thereof should not be tolerated.

"We commend the wise forethought of the President in sounding the note of warning as to the waste and exhaustion of the natural resources of the country, and signify our appreciation of his action in calling this Conference to consider the same, and to seek remedies therefor through coöperation of the Nation and the states.

"We agree that this coöperation should find expression in suitable action by the Congress within the limits of, and co-extensive with the national jurisdiction of the subject, and, complementary thereto, by the legislatures of the several states within the limits of, and co-extensive with, their jurisdiction.

"We declare the conviction that in the use of the natural resources our independent states are interdependent and bound together by ties of mutual benefits, responsibilities, and duties.

"We agree in the wisdom of future conferences between the President, members of Congress, and the Governors of the states on the conservation of our natural resources with the view of continued coöperation and action on the lines suggested. And to this end we advise that from time to time, as in his judgment may seem wise, the President call the Governors of the states, members of Congress, and others into conference.

"We agree that further action is advisable to ascertain the present condition of our natural resources, and to promote the conservation of the same. And to that end we recommend the appointment by each state of a commission on the conservation of natural resources, to coöperate with each other and with any similar commission on behalf of the Federal Government.

"We urge the continuation and extension of forest policies adapted to secure the husbanding and removal of our diminishing timber supply, the prevention of soil erosion, the protection of headwaters, and the maintenance of the purity and navigability of our streams. We recognize that the private ownership of forest lands entails responsibilities in the interests of all the people, and we favor the enactment of laws looking to the protection and replacement of privately owned forests.

"We recognize in our waters a most valuable asset of the people of the United States, and we recommend the enactment of laws looking to the conservation of water resources for irrigation, water supply, power, and navigation, to the end that navigable and other streams may be fully utilized for every purpose.

"We especially urge on the Federal Congress the immediate adoption of a wise, active, and thorough waterway policy, providing for the prompt improvement of our streams and conservation of their watersheds required for the uses of commerce and the production of the interests of our people.

"We recommend the enactment of laws looking to the prevention of waste in the mining and extraction of coal, oil, gas and other minerals with a view to their wise extraction for the use of the people, and to the protection of human life in the mines.

"Let us conserve the foundations of our prosperity."

Pamphlets.
Hawaii.

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